

05 CV 10745

JUDGE CASTEL

UNITED STATES DISTRICT COURT
~~EASTERN~~ DISTRICT OF NEW YORK
SOUTHERN

-----X
PlaSmart Inc.,

CIVIL COMPLAINT

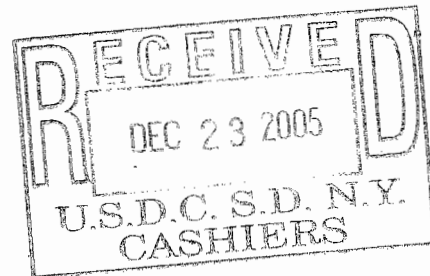
Plaintiff,

-CV-

v.

Wincell International Inc, Jar Chen Wang and
Hong Jiun Gu,

Defendants.
-----X



COMPLAINT

The Parties

1. Plaintiff is a Canadian Corporation with a principal place of business at 112-42 Antares Dr, Ottawa, Ontario, Canada, K2E 7Y4.
2. Defendant Wincell International Inc. ("Wincell"), upon information and belief, is a California Corporation with a principal place of business at 13527 Alondra Blvd, Santa Fe Springs, CA 90670.
3. Defendant Jar Chen Wang, upon information and belief, has a residence at 13735 Oak Crest Dr Cerritos, CA 90703.
4. Defendant Hong Jiun Gu, upon information and belief, has a residence in California and a regular place of business at 13527 Alondra Blvd, Santa Fe Springs, CA 90670.

Nature of the Action

5. This action for declaratory judgment of patent non-infringement and/or invalidity is brought under 28 U.S.C. § 2201.

6. This action is brought in part under Lanham Act § 43(a), 15 U.S.C. § 1125(a).

7. This action for tortious interference with business relations and trade libel arises under New York State common law.

Jurisdiction and Venue

8. Jurisdiction for the declaratory judgment action is proper under 28 U.S.C. §§ 1331, 1338 and 2201.

9. Jurisdiction for the Lanham Act action is proper under 28 U.S.C. §§ 1331 and 1338.

10. Jurisdiction for the tortious interference with business relations and trade libel is proper under 28 U.S.C. § 1367.

11. Jurisdiction if further proper under N.Y.C.P.L.R. § 302(a).

12. Venue is proper under 28 U.S.C. § 1391(b)(2) for all defendants and under 28 U.S.C. § 1391(c) for the corporate defendant.

Facts

13. Plaintiff manufactures and sells at wholesale a children's ride-on toy branded as the "PlasmaCar." Pursuant to contracts between retailers and Plaintiff, retailers throughout the United States purchase at wholesale the PlasmaCar ride-on toy from Plaintiff for retail sale.

14. The PlasmaCar ride-on toy has a distinctive appearance which has acquired distinctiveness through aggressive marketing, advertising, media coverage, word of mouth and sales.

15. Upon information and belief, Defendants have sold ride-on toys under the name “TwistCar” that bear a confusingly similar resemblance to the distinctive appearance of Plaintiff’s PlasmaCar ride-on toy. Actual consumer confusion between the products has occurred as a result.

16. On or about December 8, 2005, Defendants began sending letters to Plaintiff’s customers and to Plaintiff’s sales representatives falsely alleging that the PlasmaCar infringes one or more patents allegedly owned by Defendants, namely, U.S. Pat. Nos.: D448,430; 6,431,566; 6,722,674; and 6,860,497 (the “Asserted Patents”) (See Exhibit 1). These letters were sent, *inter alia*, to The Target Corporation, operator of the widely known Target stores throughout New York and nationally, Limpopo Toys, located in Brooklyn, New York, and Toys and More, located in Wappinger Falls, New York.

17. Upon information and belief, Defendants knew at the time these letters were transmitted that the PlasmaCar did not infringe any of the Asserted Patents and made the allegations of patent infringement in bad faith.

18. Upon information and belief, Defendants made statements, in addition to the knowingly false allegations of patent infringement, which they knew to be false. Defendants’ statements included:

[u]nlike my TWISTCAR, the PLASMACAR is not a safe item for kids because it’s easy to flip over backward while seated on back

portion of the seat in case of carelessness [sic] kid, a tall kid or 2 kids seat [sic] together.

and:

[y]ou can see the significant difference of my good quality and better safety equipment of back bumper and rotating safety wheel of front-wheel-support.

See Exhibit 1.

19. Upon information and belief, Defendants made these additional false statements solely to interfere with and disrupt Plaintiff's contractual and business relationships with its customers and sales representatives located in New York and elsewhere, to render impossible performance under contracts between Plaintiff and its customers and sales representatives, and to disrupt prospective business between Plaintiff and its customers and sales representatives.

20. Upon information and belief, during the prosecution of one or more of the applications which resulted in the Asserted Patents, Defendants Mr. Wang and Mr. Gu failed to disclose to the United States Patent Office material prior art references of which Mr. Wang and Mr Gu were aware.

21. As a result of Defendants' actions, a real case and actual controversy exist between Plaintiff and Defendants.

**First Count
Declaratory Judgement of Non-Infringement**

22. Plaintiff hereby incorporates the allegations of paragraph 1 through 20 as if stated fully herein.

23. Plaintiff seeks Declaratory Judgment of Non-Infringement of the Asserted Patents by its PlasmaCar ride-on toy.

**Second Count
Declaratory Judgement of Patent Invalidity and Unenforceability**

24. Plaintiff hereby incorporates the allegations of paragraph 1 through 20 as if stated fully herein.

25. Plaintiff seeks Declaratory Judgment that the Asserted Patents are invalid in light of certain prior art and are unenforceable due to Defendants' inequitable conduct in the course of prosecuting the applications leading to the Asserted Patents.

**Third Count
Trade Dress Infringement**

26. Plaintiff hereby incorporates the allegations of paragraph 1 through 20 as if stated fully herein.

27. Defendants by their actions have violated Lanham Act § 43(a), 15 U.S.C. § 1125(a).

28. Plaintiff has been and continues to be irreparably harmed by Defendant's past and continuing violation of Lanham Act § 43(a), 15 U.S.C. § 1125(a).

**Fourth Count
Tortious Interference with Business Relations**

29. Plaintiff hereby incorporates the allegations of paragraph 1 through 20 as if stated fully herein.

30. Defendants have tortiously interfered with Plaintiff's business relations with Plaintiff's customers and sales representatives, thereby harming Plaintiff.

**Fifth Count
Trade Libel**

31. Plaintiff hereby incorporates the allegations of paragraph 1 through 20 as if stated fully herein.

32. Defendants have committed trade libel in knowingly making false statements to Plaintiff's customers and sales representatives, thereby harming Plaintiff.


Prayer for Relief

WHEREFORE, Plaintiff respectfully requests that the Court enter judgment in favor Plaintiff:

- a. Declaring the Asserted Patents not infringed, invalid and unenforceable.
- b. Awarding actual damages to Plaintiff in an amount to be determined;
- c. Awarding exemplary damages to Plaintiff in an amount equal to three times the actual damages and profits awarded;
- d. Awarding Plaintiff its costs and attorneys' fees;
- e. Permanently enjoining Defendants from alleging to any third party that Plaintiff's PlasmaCar ride-on toy infringe any rights of Defendants or that such third party is precluded in any manner from freely offering for sale and selling Plaintiff's PlasmaCar ride-on toy.

- f. Providing all other equitable relief that the Court deems just and proper.

Respectfully submitted,
Plaintiff PlaSmart Inc.
by its attorney,

A handwritten signature in blue ink, appearing to read "Jeffrey Sonnabend", is positioned above a horizontal line.

Jeffrey Sonnabend (JS1243)
SonnabendLaw
600 Prospect Avenue
Brooklyn, NY 11215-6012
718-832-8810
JSonnabend@SonnabendLaw.com

EXHIBIT 1

WINCELL INTERNATIONAL INC.

13527 Alondra Blvd.,
Santa Fe Springs, CA 90670

TEL: 562-9261982
FAX: 562-9263126



RE: PATENT INFRINGEMENT OF PLASMACAR SOLD BY TARGET

Dear Mr. Robert J. Ulrich/Gregg W. Steinhafel,

TARGET, being leader of discount chain stores and toys Industry, your .com buyer with a very good discernment has selected and sold a new ride-on toy named "PLASMACAR" (made in China) which was honored as "Yearly Web Star for kids" by TIME magazine of Nov. 27, '05.

However, this item has infringed both my US design patent and utility patents. The patents are: USD448430S, US6431566B1, US6722674B2 and US6860497B2.

May I introduce myself: My name is Jar-Chen Wang, owner of Wincell International Inc. and the above US patents. My item has a trademark of "TWISTCAR" and has been sold on TOYS"R"US stores (small size, 24" in length with retail price of US\$29.99) and ZANY BRAINY stores (large size, 30" in length with retail price of US\$49.99). It's a great item and you may check the positive reviews made by consumers on TOYS"R"US.COM.

Many customers told me that their kids love it, fought for it and adults even senior like to play it too. It's a magic car powered neither by battery nor by pedal. Kids often asked me "How can it move?". It's a quiet and safe skater-car which you may ez-skate while sited and it's easy to play. You sit on it, lean forward, turn right half circle and turn left half circle alternatively and then you will skate forward, backward and making circles. It's a new invented item. Most parents didn't have the childhood experience of playing it and don't know how fun it is. May I suggest you to ride on it just for a few minutes to enjoy the fun because the only way to understand why all people love it is to PLAY IT BY YOURSELF. It's a very strong car and can hold up to 300 lbs. It's a toy for whole family and will create many profit for you.

Attached are my patents information, ASTM test pass report, my catalog

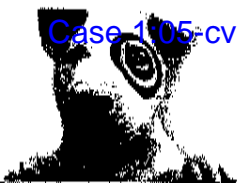
(operation instruction), TIME magazine and a sample of large size TWISTCAR(same size as PLASMACAR, shipped in another separate package). Unlike my TWISTCAR, the PLASMACAR is not a safe item for kids because it's easy to flip over backward while seated on back portion of the seat in case of a carelessness kid, a tall kid or 2 kids seat together. You can see the significant difference of my good quality and better safety equipment of back bumper and rotating safety wheel of front-wheel-support. My TWISTCAR had passed the ASTM F963 test through US ACTS testing labs..

In order to avoid unnecessary patent litigation suit and future potential suit by injured consumers to TARGET, would you please told your buyers to cease the infringement behavior and ask your store buyer and .com buyers to talk with me? What TARGET need to do is just correct vendor file to a right legal vendor with better quality and I will give TARGET a good offer. It will be my honor and pleasure to be vendor of TARGET. Would you please also provide me with a report of the total sales of any Plasmacars Target has sold, the cost of Plasmacar to your company and your retail price. I'll need the information for my attorney to talk to Mr. Timothy Kimber (owner of Plasmart Inc.). Your attention will be highly appreciated! Thanks!

Sincerely Yours,


J C WANG
President
Wincell International, Inc.

11/29/05



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[GIFT REGISTRIES](#) [GIFTCARDS](#) [WISH LIST](#) [TARGET STORES](#) [WEEKLY](#)

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free shipping Plasma Car Blue Ride-On Vehicle

web only
\$69.99

Quantity:

[+](#) **ADD TO CART**

OR

[Sign-in](#) for 1-Click

[+](#) ADD TO CLUB W-000

[+](#) ADD TO TARGET BABY

[+](#) ADD TO WISH LIST

[VIEW LARGER IMAGE](#)

Availability :

Usually ships within 5 to 7 days.

[FEATURES](#) [DESCRIPTION](#) [ADDITIONAL INFO](#) [SHIPPING INFO](#)

- Kid-powered ride-on toy is set in motion by your child's energy
- Uses gravity, centrifugal force and friction to move - no batteries needed
- Holds up to 220 lb. on smooth surfaces; 120 on rough surfaces
- Plastic construction
- 16-1/2Hx31-1/8Wx14-1/4D"

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Cheerleader mat.

Learn to cheer at three different skill levels or three pre-programmed routines by following the blinking lights on the display.

Search #242-042553.

Sale \$24.99

online only

PlasmaCar ride-on vehicle.

This ride-on toy is kid-powered. It uses gravity, centrifugal force and friction to

move. No battery needed.

Search #242-042553.

Age 3 and up

Sale \$44.99

online only

3-in-1 doll pram, carrier and stroller.

Lift the carrier off

the pram to reveal

a reclining stroller.

For dolls up to 24".

Search #026-01-0065. Ages 3

and up. Assembly required.

Sale \$24.99

online only

* Patent infringement

TIME

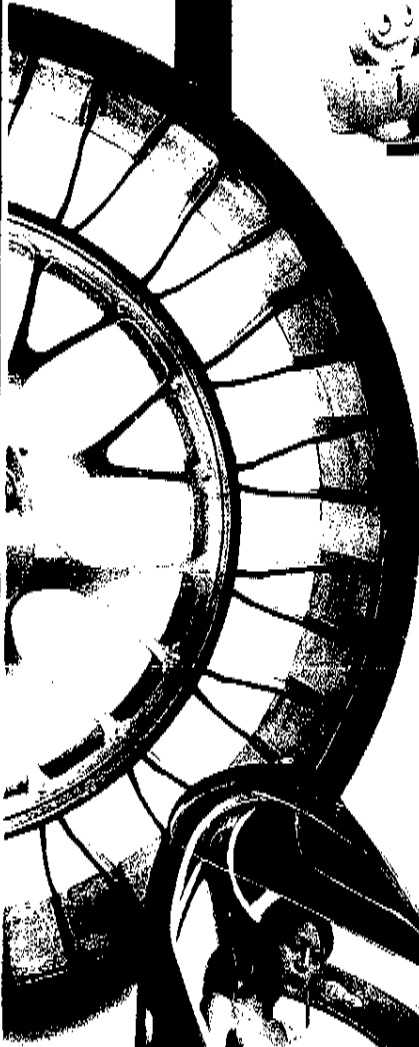
THE MOST AMAZING INVENTIONS OF 2005

Look what the labs came up with: from wacky wheels to new robots to Snuppy the cloned dog

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BEST & WORST GOVERNORS
PURE CASE CLOONEY'S LATEST



by Hape International
\$10 at dotstoys.com.



● Full Tilt

To ride the Plasma Car, lean forward and crank the steering wheel from side to side. Centrifugal force, gravity and friction work together to propel you forth. Mom and Dad can try it too—it supports up to 220 lbs. on a smooth, flat surface. \$70 at sandmore.biz.

Time Magazine

TIME, NOVEMBER 21, 2005

Wincell Twistcar

Large: 30 in. // Small: 24 in.
(up to: 300 lbs) (up to: 90 lbs)

No Battery
or Pedals!!

Indoor and Outdoor!!!

Quiet, Safe,
and Fun !!!

All you have
to do is twist!!



805 POLICE
Size: 23.2(L) x 15.6(W) x 16.0(H) in.



908 CIRCUS
Size: 22.2(L) x 15.0(W) x 16.0(H) in.



805 ARCHER
Size: 23.2(L) x 15.6(W) x 16.0(H) in.



524 GEN BOY / GEN GIRL
Size: 23.2(L) x 15.6(W) x 16.0(H) in.



812 HUNTER
Size: 23.2(L) x 15.6(W) x 16.0(H) in.



560 VENUS
Size: 40.4(L) x 21.2(W) x 16.0(H) in.



717 JUMBO AIRPLANE
Size: 44.1(L) x 22.2(W) x 16.0(H) in.



801 WIND RIDER
Size: 23.2(L) x 15.6(W) x 16.0(H) in.



819 TEAM SPORT
Size: 44.1(L) x 22.2(W) x 16.0(H) in.



915 DYNAMIC
Size: 42.7(L) x 21.4(W) x 17.0(H) in.



814/817 FORMULA
Size: 41.7(L) x 20.0(W) x 16.0(H) in.

Size : 43.3 (L)X30(W)x25.8(H) in.



Size : 48.5 (L)X37(W)x34.6(H) in.

Size : 48.5 (L)X37(W)x34.6(H) in.

**925 Dynamic II**

Size : 45.3 (L)X25.2(W)x17.3(H) in.

**600 Gemini**

Size : 52.6 (L)X27.6(W)x26.4(H) in.

**818 Golden Eagle II**

Size : 38.6 (L)X18.5(W)x25.2(H) in.

**319 Team Sport**

Size : 44.1(L)X25.2(W)x16.9(H) in.

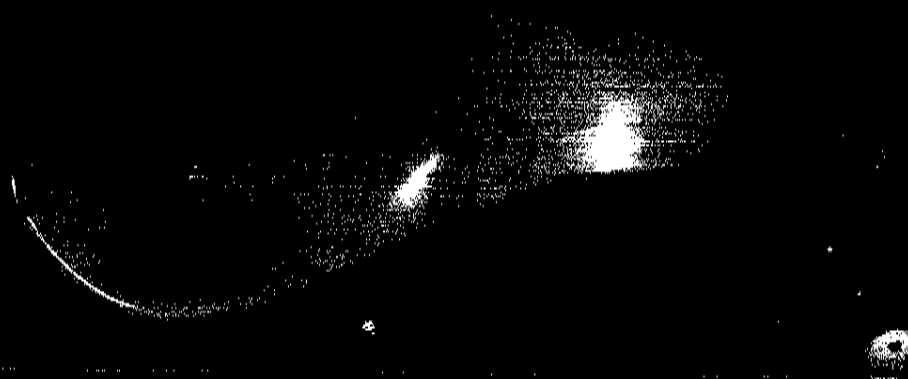
**Wincell****International, Inc.**Tel: (562)926-1985 Fax: (562)926-3126 Toll Free: 1-800-879-8828 <http://www.twistcar.com>

**Comes in
two sizes!!**

TEL: (562)9261985 FAX: (562)9263126

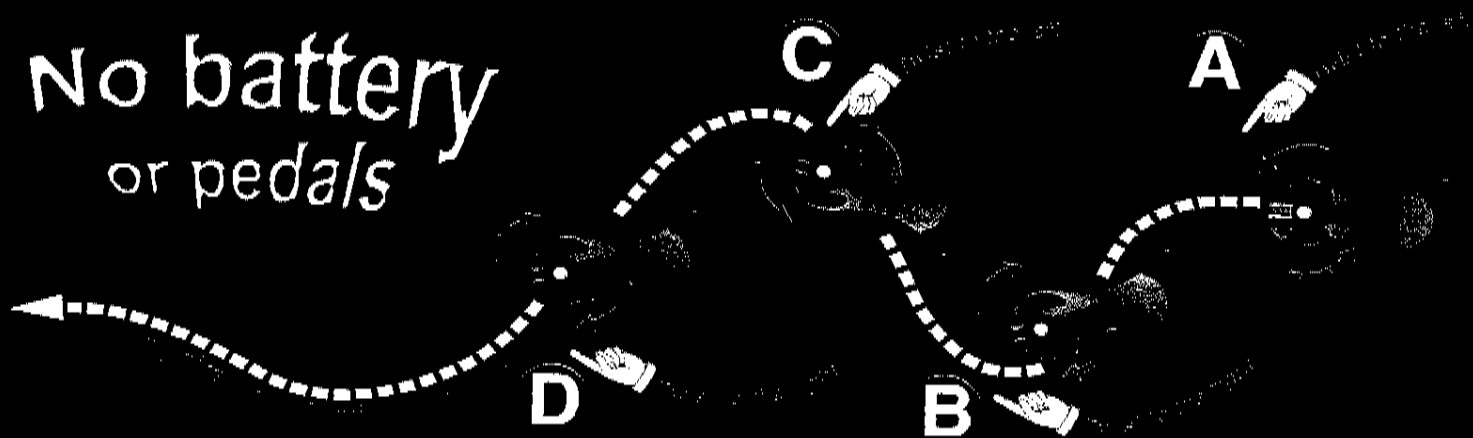
E-mail: WINCELLUSA@YAHOO.COM

16320 Bloomfield Ave., Cerritos, CA 90703



Large: 30 in. // Small: 24 in.

**No battery
or pedals**



- * Quiet, safe and fun.
 - * Indoor and outdoor.
 - * For 2 years old and up (up to 40 lbs, 90 lbs)
 - * Battery Operated and Special Coating!!! (Optional)
- Just turn the handle repeatedly like A B C D, and you are moving!!



MTL-ACTS

WINCELL INTERNATIONAL, INC.

Technical Report: (5102)343-0107 (RETEST)
 Date Received: Dec 09, 2002

December 16, 2002

Page 1 of 1

WINCELL INTERNATIONAL, INC.
 16320 BLOOMFIELD AVE.
 CERRITOS, CA 90703

RESULT: PASS

Sample Description:	TWIST CAR (A RIDE-ON-CAR) - RETEST	
Vendor:	WINCELL INTERNATIONAL, INC.	
Manufacturer:	18252	Retest Sample Size: 3 PIECE(S)
Labeled Age Grade:	FOR 2 YEARS OLD AND UP	Style No(s): 247378
Appropriate Age Grade:	2 YEARS OF AGE AND OVER	PO No.: N/A
Shipping Date:	N/A	Client Item/Part No.: N/A
Country of Origin:	TAIWAN	Assortment No.: N/A
Country:	N/A	UPC No.: 01899001006
Buyer:	N/A	SKN/SKU: N/A
Division:	N/A	Phase/Dept.: PRE-TRU TESTING

RETESTS:

- ASTM F963 Labeling

- Packaging and labeling evaluation

TESTS:

The following test(s) was previously conducted and the result(s) has been transferred from Technical Report No. (5102)310-0135.

- 16 CFR 1500 Mechanical hazards
- 16 CFR 1500.44 Flammability (solids)
- ASTM F963 Mechanical hazards

The sample(s) MEETS the following requirement(s):

- The mechanical hazards requirements of 16 CFR 1500, "Federal Hazardous Substances Act Regulations".
- The flammability requirements of 16 CFR 1500.3(c)(6)(vi), "Flammable solid" (FHSA regulations).
- The mechanical hazards requirements of ASTM F963-96a, "Standard consumer safety specification on toy safety".
- The labeling requirements of ASTM F963-96a, "Standard consumer safety specification on toy safety".
- The packaging and labeling requirements of the client's testing program.

ACTS TESTING LABS, INC.

David P. Dart
 Associate Product Engineer,
 Technical Consulting and Support Services

/jln



This report is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of the report or trademark, is permitted only with our written permission. Our report is limited to the test samples identified herein. The results and conclusions of this report are not necessarily indicative or representative of the statistical quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by the client and the results thereof. You shall have thirty days from receipt of this report to request additional testing of the samples or to notify us of any omissions relating to our report, provided, however, such notice shall be in writing and shall specifically address the issue(s) raised. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness and accuracy of the report conducted and the correctness of the report contents.

ACTS TESTING LABS, INC.
 1000 Main Street
 Buffalo, NY 14228-4884 USA
 Tel: 716 835 3300 www.mtl-acts.com

US006431566B1

(12) **United States Patent**
Gu(10) Patent No.: **US 6,431,566 B1**
(45) Date of Patent: **Aug. 13, 2002**(54) **SAFETY DRIVING EQUIPMENT FOR TODDLER'S SCOOTER**2,007,447 A * 7/1935 Johnson 16/48
3,433,500 A * 3/1969 Christensen 16/47(76) Inventor: **Hong-Jiun Gu**, P.O. Box No. 6-57,
Chung-Ho City, Taipei Hsien, 235 (TW)

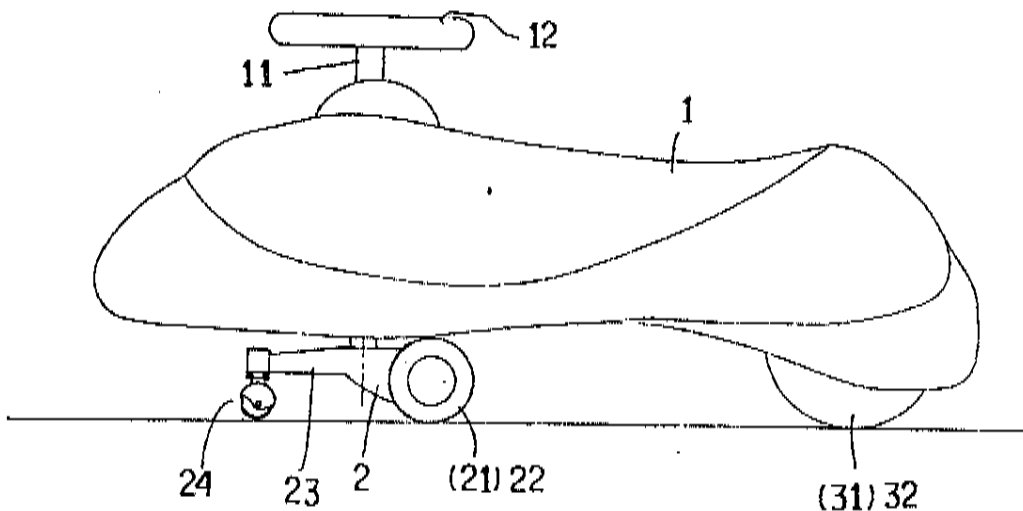
* cited by examiner

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.*Primary Examiner*—Robert P. Olszewski
Assistant Examiner—James S. McClellan
(74) *Attorney, Agent, or Firm*—Troxell Law Office PLLC

(21) Appl. No.: 09/755,159

(57) **ABSTRACT**(22) Filed: **Jan. 8, 2001**(51) Int. Cl.⁷ **B62M 1/00**(52) U.S. Cl. **280/87.021; 280/87.051;**
16/48(58) **Field of Search** 280/87.021, 87.051,
280/87.01; 16/18 R, 47, 48, 29(56) **References Cited****U.S. PATENT DOCUMENTS**

1,666,139 A * 4/1928 Johnson 16/48

1 Claim, 3 Drawing Sheets

U.S. Patent

Aug. 13, 2002

Sheet 1 of 3

US 6,431,566 B1

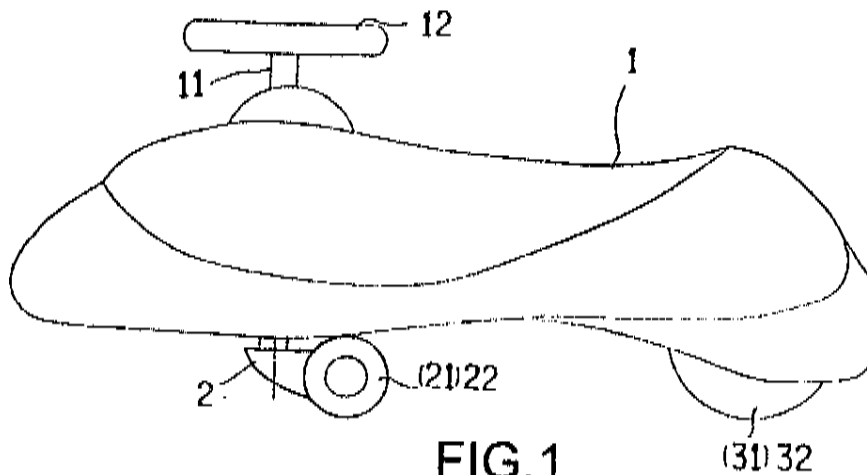


FIG. 1

Prior Art

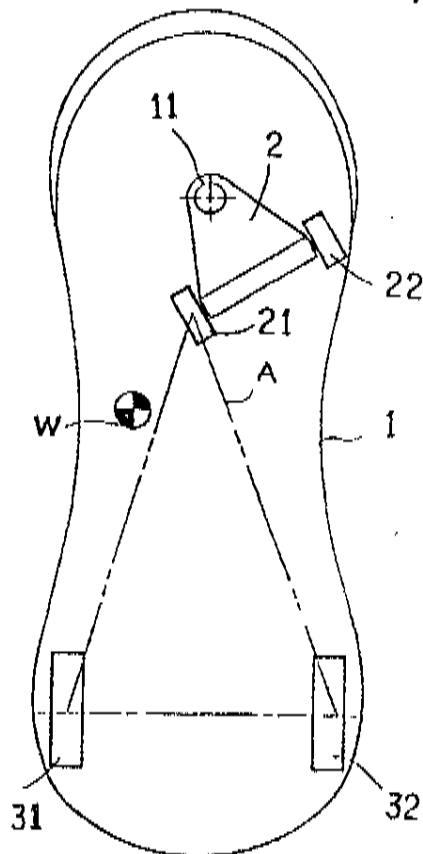


FIG.2

Prior Art

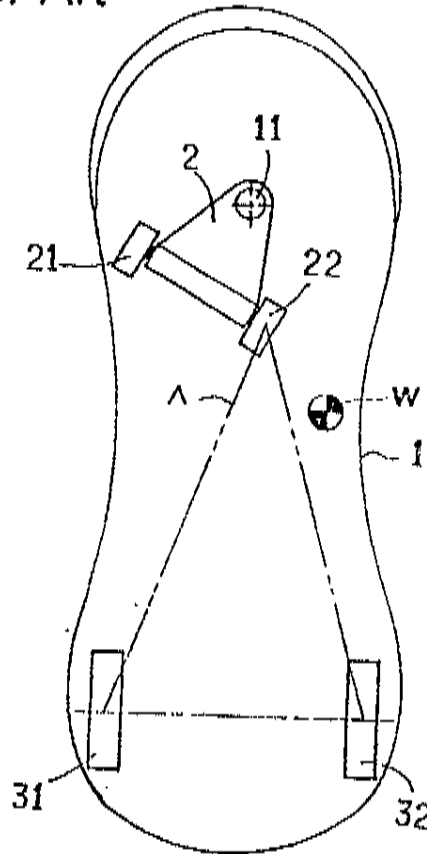


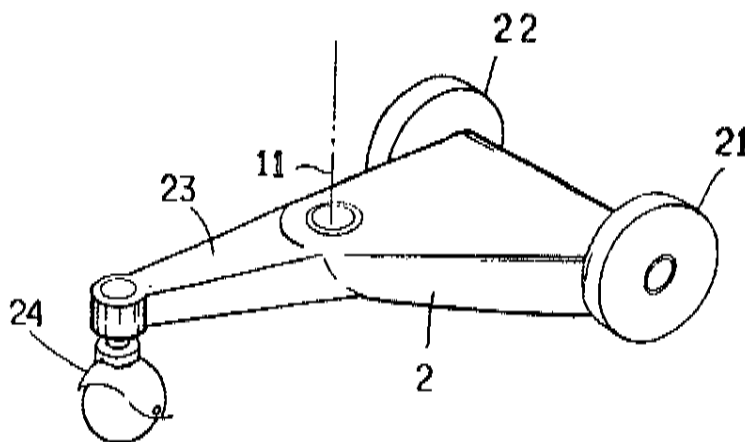
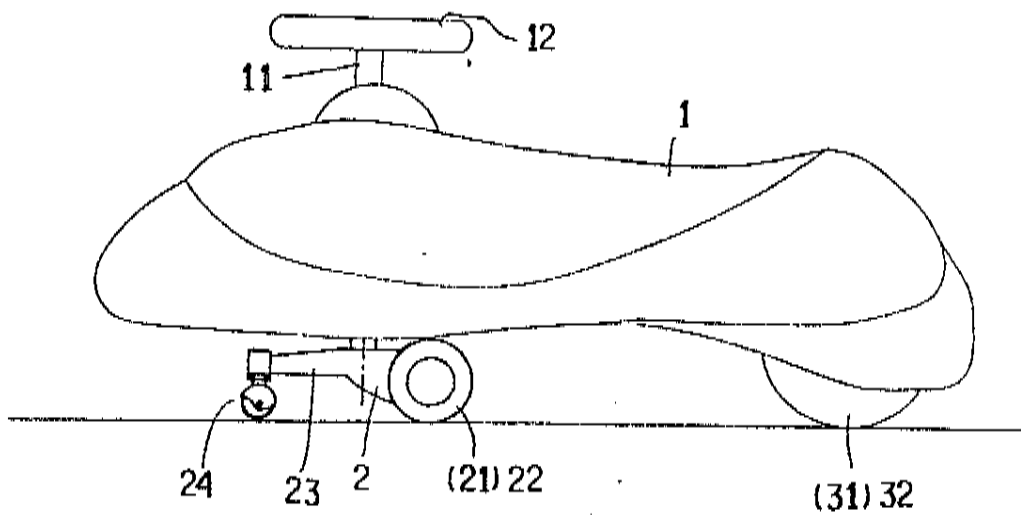
FIG.3

Prior Art

U.S. Patent

Aug. 13, 2002

Sheet 2 of 3

US 6,431,566 B1**FIG. 4****FIG. 5**

U.S. Patent

Aug. 13, 2002

Sheet 3 of 3

US 6,431,566 B1

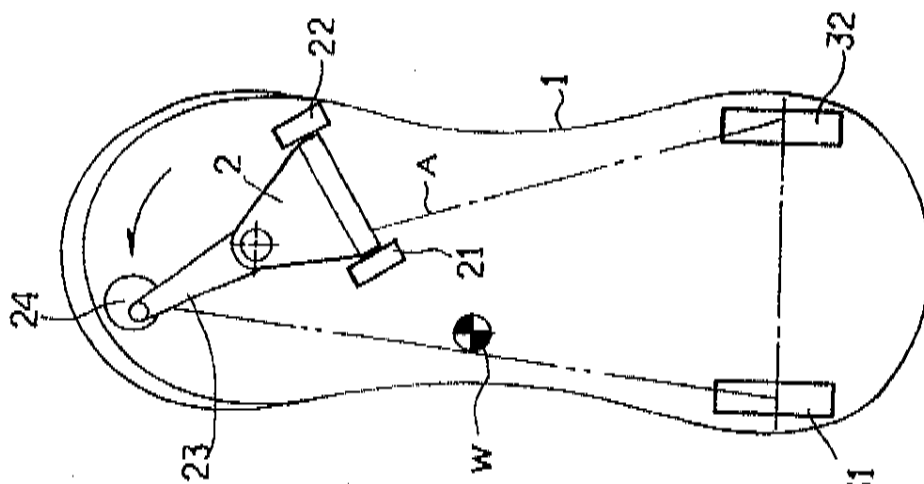


FIG. 6

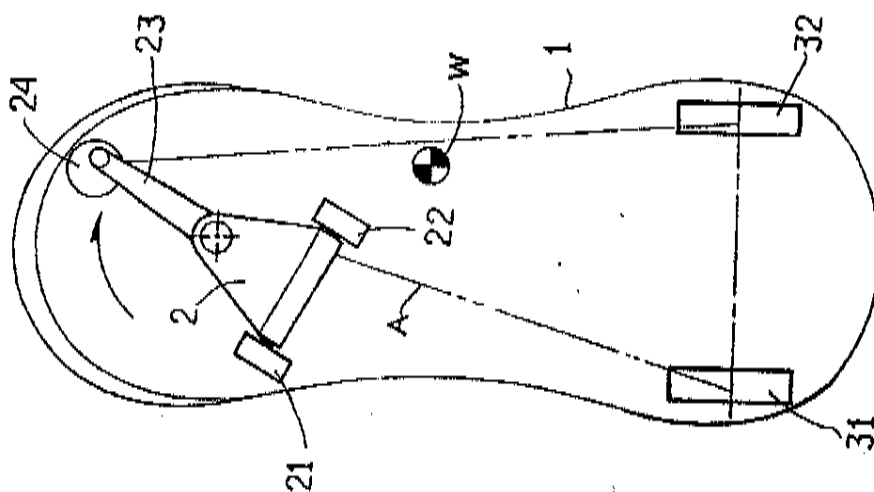


FIG. 7

US 6,431,566 B1

1

**SAFETY DRIVING EQUIPMENT FOR
TODDLER'S SCOOTER****BACKGROUND OF THE INVENTION****1) Field of the Invention**

The invention herein relates to a safety driving equipment for a toddler's scooter, mainly to provide an auxiliary wheel, relative to the rear wheels of the scooter body, to the driving structure of a toy scooter to increase the safety area and regulating the location of the force center.

2) Description of the Prior Art

As shown in FIGS. 1, the side elevation isometric drawing of a conventional scooter structure comprises of a scooter body (1), mounted with live left and right rear wheels (31, 32) at the rear; in the front, one vertically disposed shaft level (11) with handlebars (12) connected on the top and a driving triangular base (2) fastened at the bottom mounted with left and right rear driving wheels (21, 22); the rider straddled on the scooter body (1) turns the handlebars (12) by hands to drive the triangular base (2) connected through the shaft level (11), thereby to move the left and the right driving wheels (21, 22) alternatively to achieve the function of wobbling movement in arcuation.

Referring to FIGS. 2 and 3, as shown in the bird's-eye view, the driving triangular base (2) centered by the shaft level (11) moves to the left or the right sides to enable the left and the right driving wheels (21, 22) to achieve the purpose of arcuate approach alternatively; furthermore, as the force center (W) on the triangular base swings in a great arc, the force center (W) will define a safety area (A), usually at one of the auxiliary wheel on the driving triangular base and relative to the left rear wheel (31) or the right rear wheel (32); if the force center (W) locates within the safety area (A), the scooter body will not flip over; while moving in a fast speed, the handlebars (12) operated by hands will generate a reaction force which will make the force center (W) to receive a pulling force and shift its position; if the reaction force exceeds a certain degree (while the handlebars are forcefully operated) and accelerates by the inertia force generated from the mass of the human body in a fast proceeding speed, the force center (W) will easily move beyond the safety area (A) and causes the danger of having the scooter body tumble forward and oblique; just as shown in the said Figures, while moving the scooter by operating the shaft level (11) through the handlebars, the triangular base (2) will deviate to right or left due to the generated reaction force and adding in the proceeding inertia of driving, the force center (W) will usually exceed the congruent sides of the triangular safety base; therefore, scooters similar to this kind tend to flip over.

SUMMARY OF THE INVENTION

Specifically, the invention herein is consisted of an extended wheel arm at the end relative to the driving wheels of the driving triangular base; an auxiliary wheel capable of making universal rolling is mounted lively at the end of the wheel arm; the driving triangular base is driven by the handlebars of the scooter body through the shaft level; therefore, by moving around based on the shaft level as the center and utilizing the relationship of the auxiliary wheel relative to the rear wheels of the scooter body to increase the possibility of locating the force center in the regulated safety area.

To enable a further understanding of the said objectives, the technological methods and the efficiency of the invention

2

herein, the brief description of the drawings below is followed by detail description of the preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation drawing of a conventional scooter.

FIG. 2 is an isometric drawing of the deviated force center on a conventional scooter in wobbling.

FIG. 3 is a second isometric drawing of the deviated force center on a conventional scooter in wobbling.

FIG. 4 is a pictorial drawing of the invention herein.

FIG. 5 is a pictorial drawing of the safety equipment constructed according to the invention herein.

FIG. 6 is the first isometric drawing of the invention herein in functional operation.

FIG. 7 is the second isometric drawing of the invention herein in functional operation.

**DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENT**

Referring to FIG. 4, to prevent the problem of having the tendency to flip over of the conventional scooter, an extended forward wheel arm (23) is mounted at the front end of the driving triangular base; an auxiliary wheel (24) capable of making universal rolling mounted at the end of the wheel arm (23) and relative to the center forward position of the rear driving wheels (21, 22); therefore, while the handlebars are operated to drive, through the center point defined by the disposed shaft level (11), as shown in FIG. 5, to make the triangular base (2) to swing right and left, and also through the said triangular base (2) to gear the driving wheels (21, 22) to proceed arcuately to left or right. Referring to FIGS. 6 and 7, since there is an auxiliary wheel (24) mounted lively at the end of the back of the front wheel arm (23) on the triangular base (2), if the scooter body makes more obvious bounce during the proceeding movement, the said auxiliary wheel (24) will allow the forward touching point fall directly on the said auxiliary wheel (24); also as shown in FIG. 6, if the gravity force of the whole scooter body (1) leaning forward falls on the auxiliary wheel (24), the said auxiliary wheel (24) relative to the two rear wheels (31, 32) mounted on the rear sides of the scooter body (1) will immediately define a larger triangular safety supporting area (A), just as the force center (W) shown in FIGS. 2 and 3, (with the same momentum, the deviating position will be the same), the force center will be regulated within the larger safety area (A), even when the handlebars are operated to deviate to the right, as shown in FIG. 7, the auxiliary wheel (24) relative to the rear wheels (31, 32) will as well define a larger safety area (A) allowing the force center (W) to be regulated to shift within the safety area (A), therefore, protecting the scooter from the danger of flipping over; by means of the universal wheel (24) mounted at the end of the extended forward wheel arm (23) on the triangular base (2) to efficiently enlarge the access to the safety area and enable the force center (W) still shift within the said larger safety area even if the force center deviates; furthermore, the auxiliary wheel (24) is a universal wheel, so either because of automatic movement, under forcing or wobbling operation, the universal wheel will move along to any direction without encountering the obstacle caused by the angle of proceeding; basically, to have the universal wheel with the height from the ground higher than that of the driving wheels (21, 22) and the auxiliary wheel (24) cooperating in time with the rear wheels (31, 32) to form a larger

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safety area when the scooter body (1) bounces obviously during proceeding or the force center deviates, thus, the equipment properly and efficiently achieves the safety purpose.

Furthermore, the length of the wheel arm (23) is better limited within the outer rim of the scooter body; if too long, the burden of operation the wobble will be effected; if too short, then there is no functional meaning; in fact, the length should be the diameter of the arcuate movement of the auxiliary wheel (24) no longer than the wheel base between the two rear wheels.

Therefore, the invention herein provides a safety driving equipment for the toddler's scooter and meets new patent application requirements and is hereby lawfully submitted to the patent bureau for review and the granting of the commensurate patent rights.

What is claimed is:

1. A safety scooter comprising:

a) a scooter body having an outer rim and two rear wheels, the two rear wheels being laterally spaced apart a predetermined wheel base distance;

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- b) a steering shaft turnably mounted in a front portion of the scooter body and having an end portion extending from a bottom of the scooter body;
- c) a triangular base attached to the end portion of the steering shaft adjacent to a first corner of the triangular base so as to turn with the steering shaft, the triangular base including two driving wheels mounted at second and third corners, respectively; and,
- d) a front wheel arm extending from the first corner of the triangular base and having a universal auxiliary wheel mounted at an end thereof, a length of the front wheel arm being such that the auxiliary wheel remains within the outer rim of the scooter body during turning of the triangular base and such that the auxiliary wheel undergoes arcuate movement about an arc having a diameter no greater than the wheel base distance between the two rear wheels, wherein the length of the front wheel arm is such that the auxiliary wheel undergoes arcuate movement about an arc having a diameter equal to the wheel base distance between the two rear wheels.

* * * * *

The United States of America



The Director of the United States Patent and Trademark Office

Has received an application for a new, original, and ornamental design for an article of manufacture. The title and description of the design are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the design shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the design throughout the United States of America, or importing the design into the United States of America for the term of fourteen years from the date of grant of this patent.

Nicholas P. Ebdici

Acting Director of the United States Patent and Trademark Office

Cheryl McBurn

Attest



US00D448430B1

(12) **United States Design Patent** (10) **Patent No.:** **US D448,430 S**
Wang (45) **Date of Patent:** **** Sep. 25, 2001**

(54) **TWIST CAR**

6,039,327 * 3/2000 Spector 280/87.021

(76) **Inventor:** **Jar Chen Wang**, 16320 Bloomfield Ave., Cerritos, CA (US) 90703**OTHER PUBLICATIONS**

Sears Wishbook, P579, 1992.*

(**) **Term:** **14 Years**

* cited by examiner

(21) **Appl. No.:** **29/141,032***Primary Examiner*—Raphael Barkai(22) **Filed:** **Apr. 27, 2001**(74) *Attorney, Agent, or Firm*—Raymond Y. Chan; David and Raymond Patent Group(51) **LOC (7) CL** **21-01**(57) **CLAIM**(52) **U.S. CL** **D21/433; D21/424**

The ornamental design for a twist car, as shown.

(58) **Field of Search** **D21/419-435, D21/533-539, 548-551; D12/1, 16; 446/424-425, 456-457, 465, 470; 280/87.01, 87.021, 828, 1.13, 87.041, 87.042****DESCRIPTION**(56) **References Cited****U.S. PATENT DOCUMENTS**

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FIG. 1 is a perspective view showing my new design.

FIG. 2 is a front view thereof.

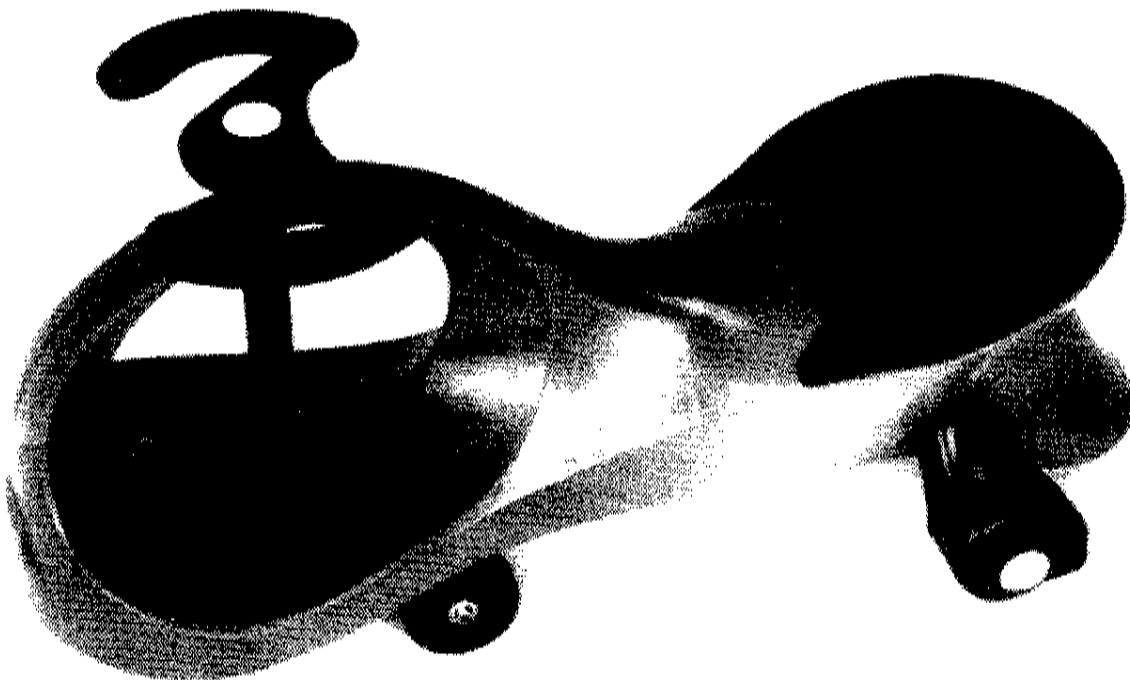
FIG. 3 is a rear view thereof.

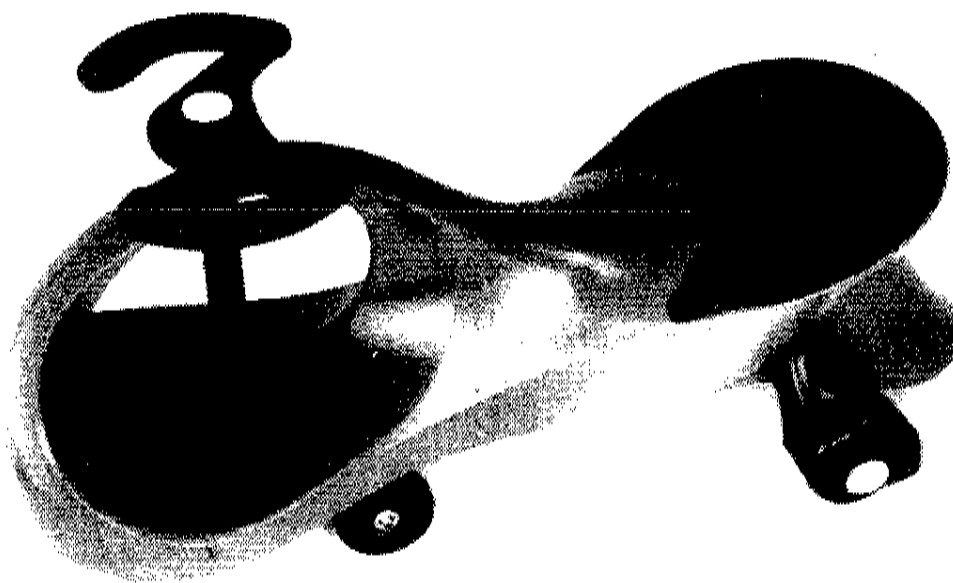
FIG. 4 is a right end view thereof.

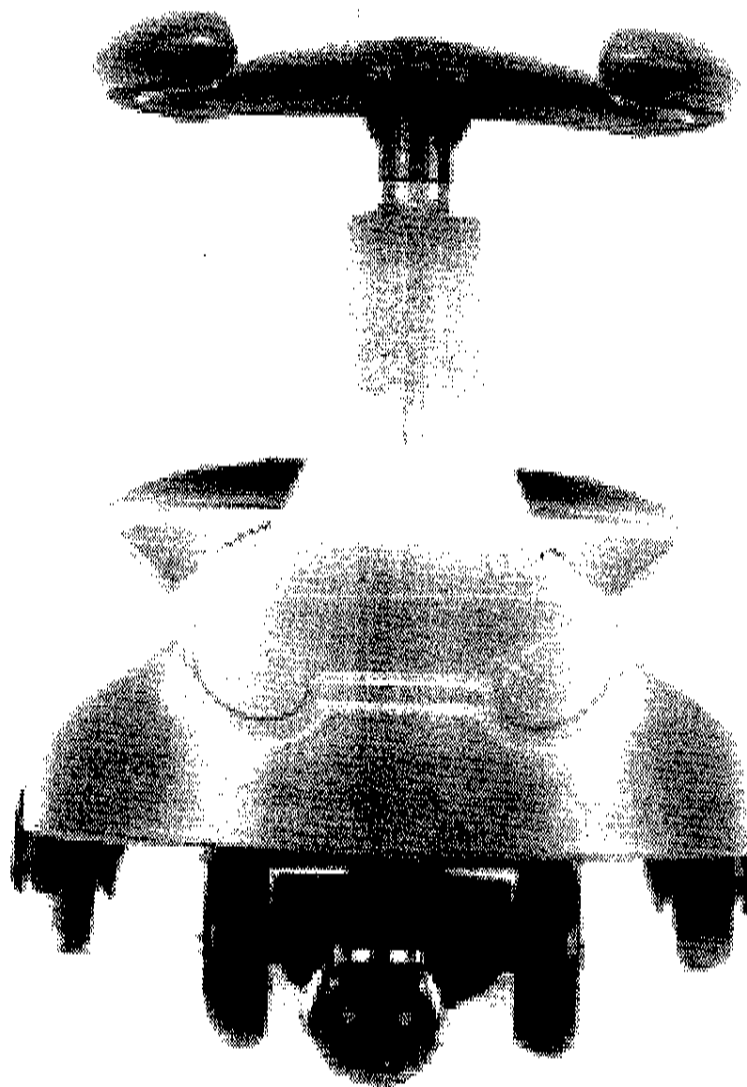
FIG. 5 is a left end view thereof.

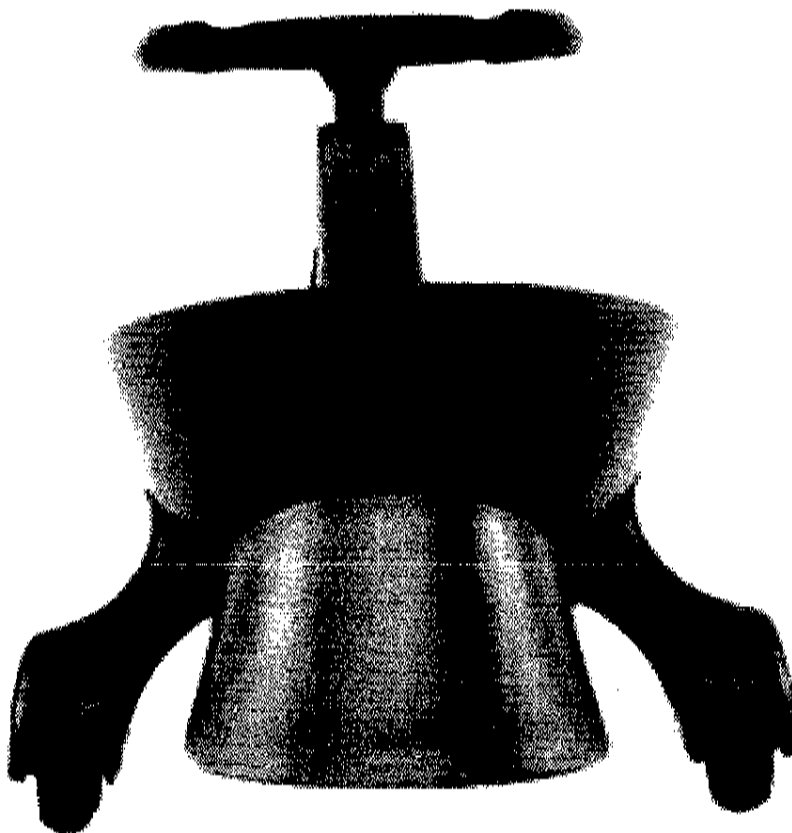
FIG. 6 is a top view thereof; and,

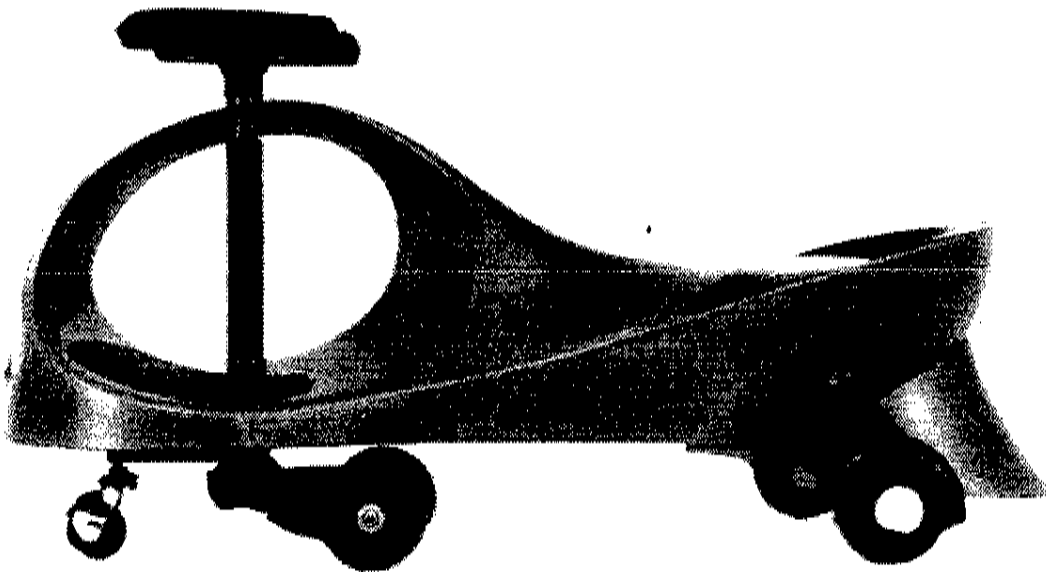
FIG. 7 is a bottom view thereof.

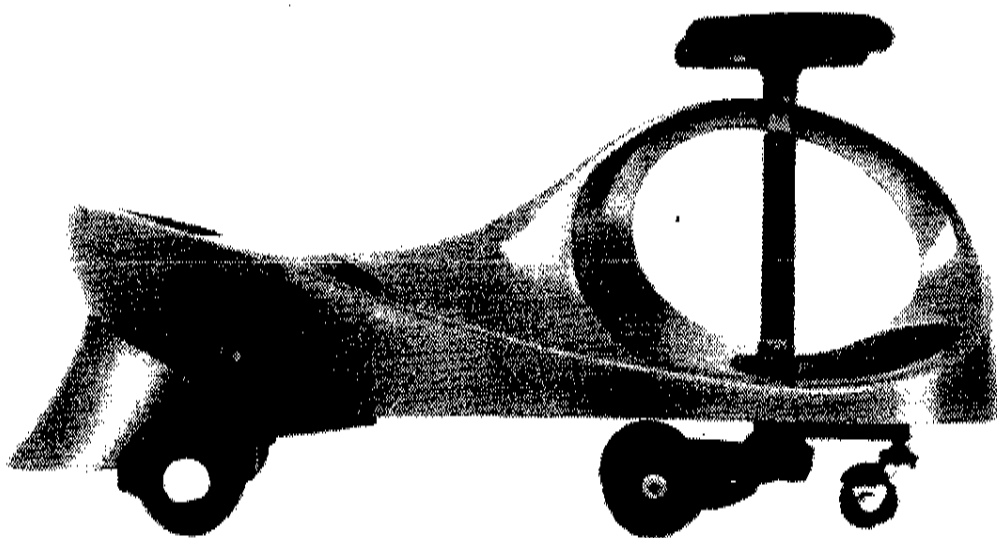
1 Claim, 7 Drawing Sheets

U.S. Patent**Sep. 25, 2001****Sheet 1 of 7****US D448,430 S****FIG. 1**

U.S. Patent**Sep. 25, 2001****Sheet 2 of 7****US D448,430 S****FIG. 2**

U.S. Patent**Sep. 25, 2001****Sheet 3 of 7****US D448,430 S****FIG. 3**

U.S. Patent**Sep. 25, 2001****Sheet 4 of 7****US D448,430 S****FIG. 4**

U.S. Patent**Sep. 25, 2001****Sheet 5 of 7****US D448,430 S****FIG. 5**

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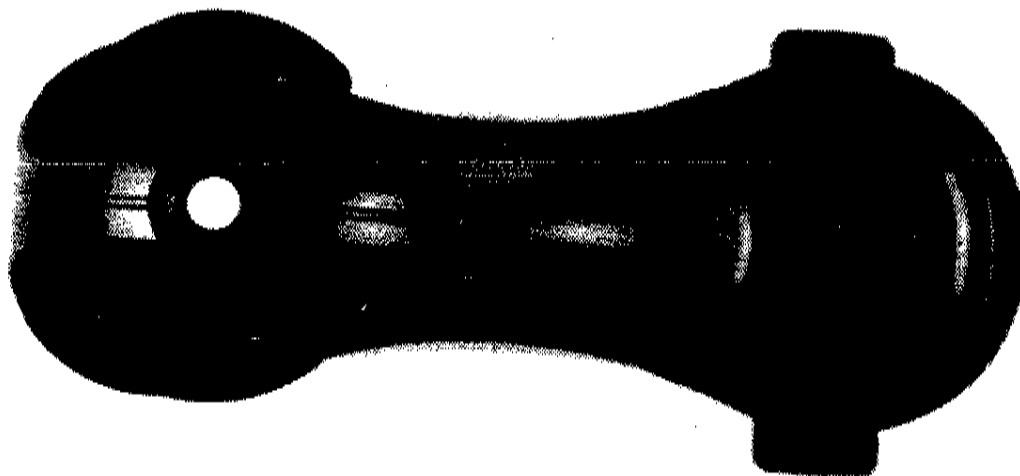


FIG. 6

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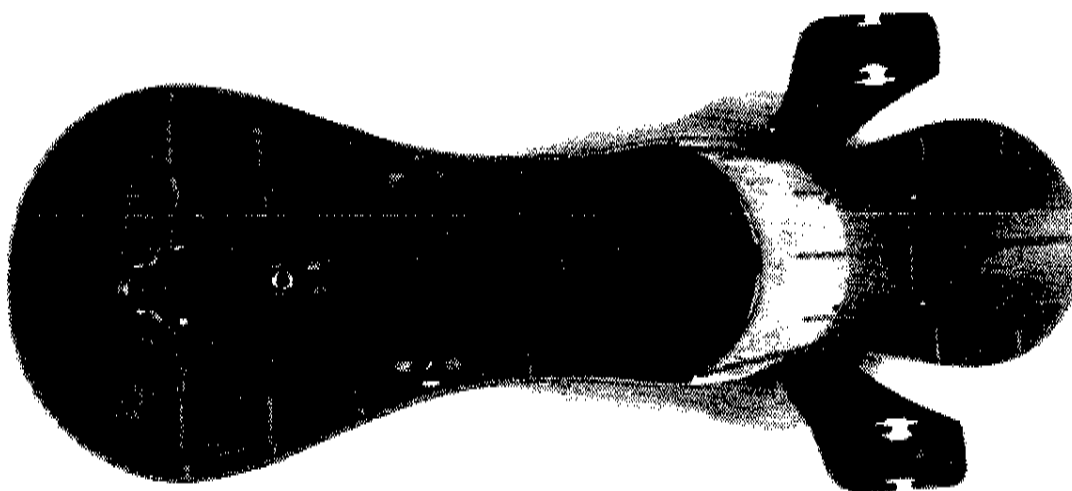


FIG. 7

The
United
States
of
America



**The Director of the United States
Patent and Trademark Office**

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extensions.

Jon W. Dudas

Acting Director of the United States Patent and Trademark Office

US006722674B2

(12) **United States Patent**
Gu et al.(10) **Patent No.: US 6,722,674 B2**
(45) **Date of Patent: Apr. 20, 2004**(54) **SAFETY DRIVING EQUIPMENT FOR SCOOTER**(75) **Inventors: Hong-Jiun Gu, Taipei (TW); Jar Chen Wang, 16320 Bloomfield Ave., Cerritos, CA (US) 90703**(73) **Assignees: Hong Jiun Gu, Taipei (TW); Jar Chen Wang, Cerritos, CA (US)**(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 205 days.(21) **Appl. No.: 09/909,399**(22) **Filed: Jul. 18, 2001**(65) **Prior Publication Data**

US 2001/0052682 A1 Dec. 20, 2001

Related U.S. Application Data(63) **Continuation-in-part of application No. 09/755,159, filed on Jan. 8, 2001, now Pat. No. 6,431,566.**(51) **Int. Cl.⁷ B62M 1/00**(52) **U.S. Cl. 280/87.021; 280/87.01; 280/87.051**(58) **Field of Search 280/218, 87.01, 280/87.021, 87.041, 87.042, 87.051, 47.11, 47.12; 297/5; D21/423; 296/177**(56) **References Cited****U.S. PATENT DOCUMENTS**

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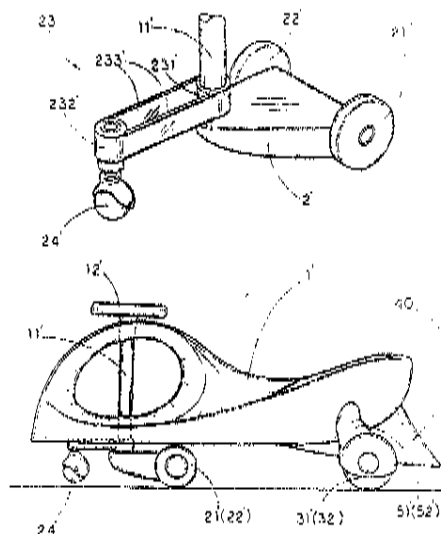
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Primary Examiner—Brian L. Johnson*Assistant Examiner*—Kelly E. Campbell(74) *Attorney, Agent, or Firm*—Raymond Y. Chan; David and Raymond Patent Group(57) **ABSTRACT**

A safety driving equipment for a scooter, includes a twister member with a supporting arm at the end thereof opposite to the driving wheels. A universal safety wheel is mounted at the free end of the supporting arm and a transmission unit is extended to connect the twister member at a position between the safety wheel and the driving wheels. The safety wheel is capable of efficiently providing an increased safety area while the scooter in wobbling mainly to maintain the force center shifting within the safety area.

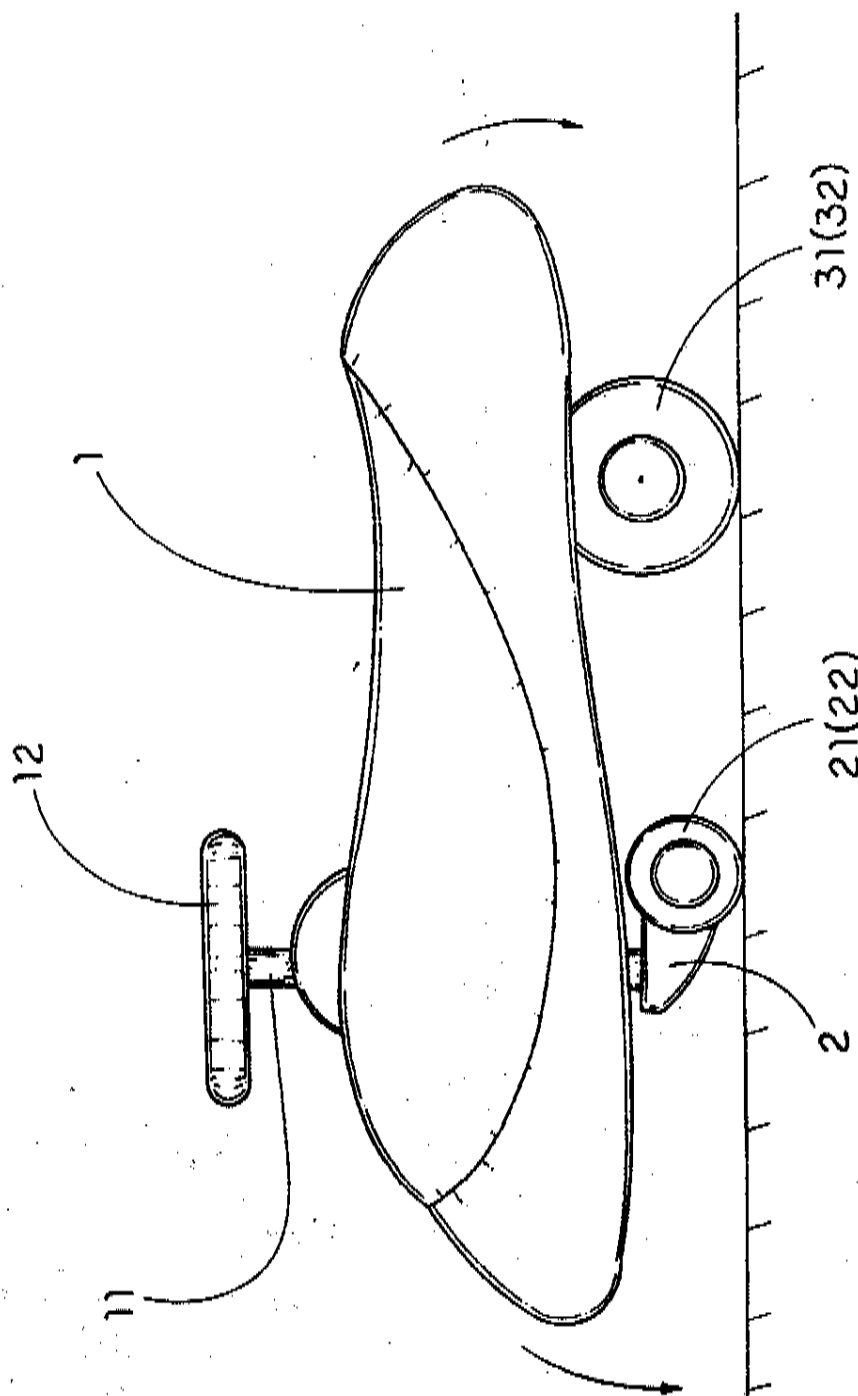
19 Claims, 7 Drawing Sheets

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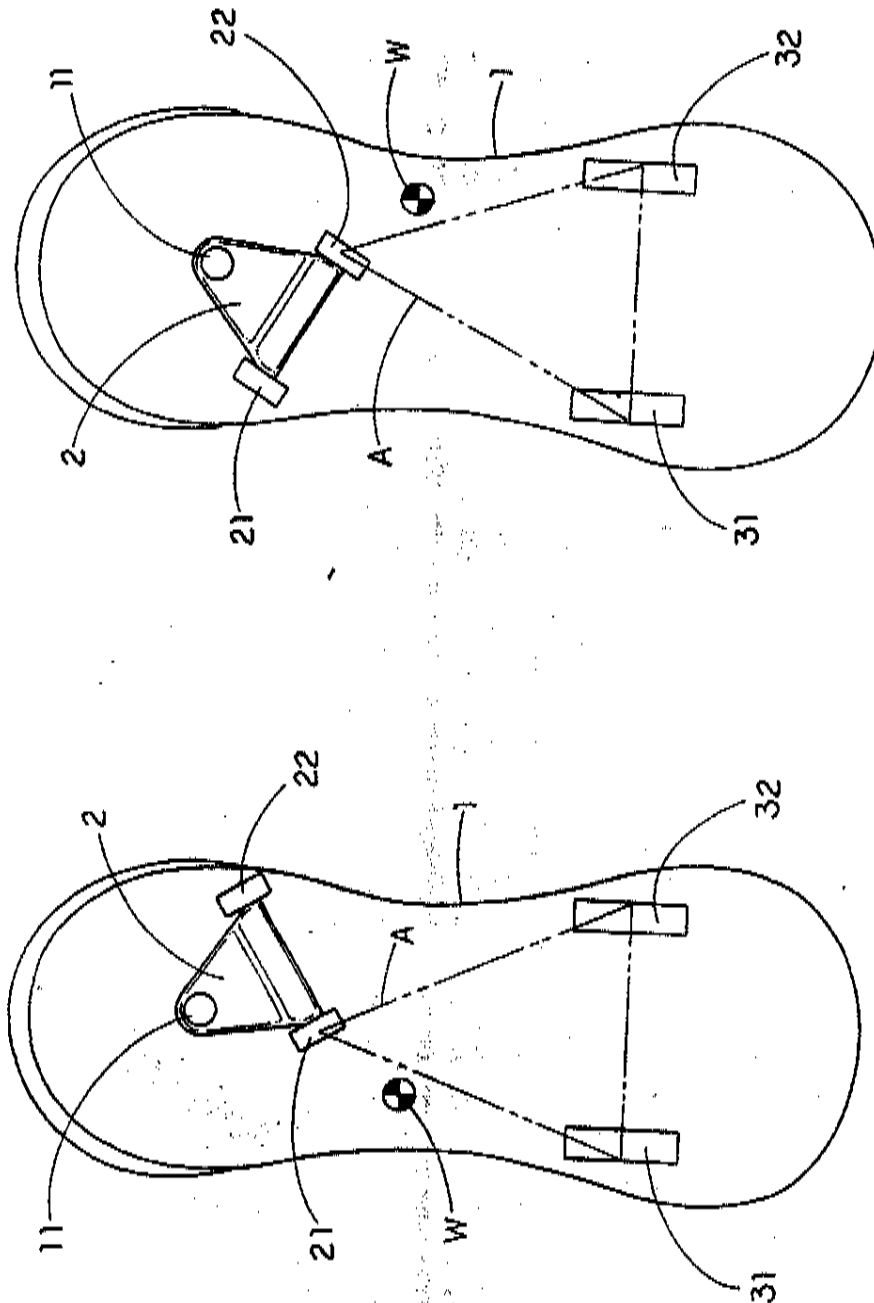
FIG. 1
PRIOR ART

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FIG. 2
PRIOR ARTFIG. 3
PRIOR ART

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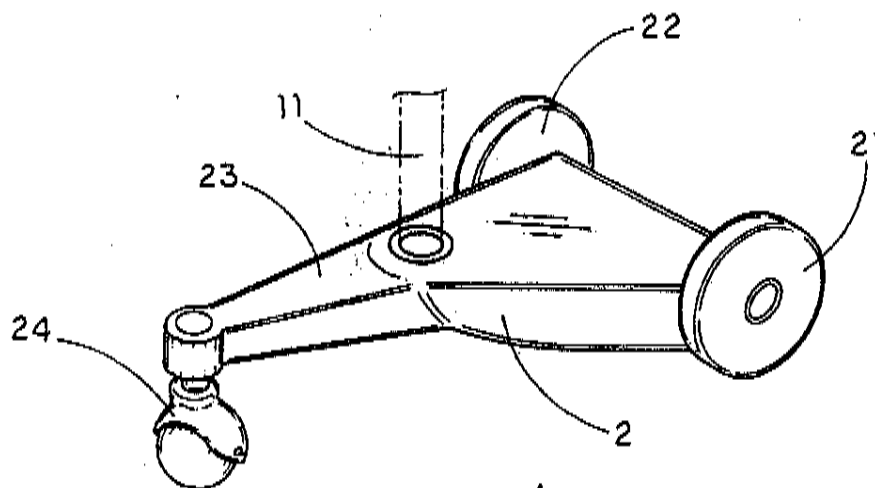


FIG. 4

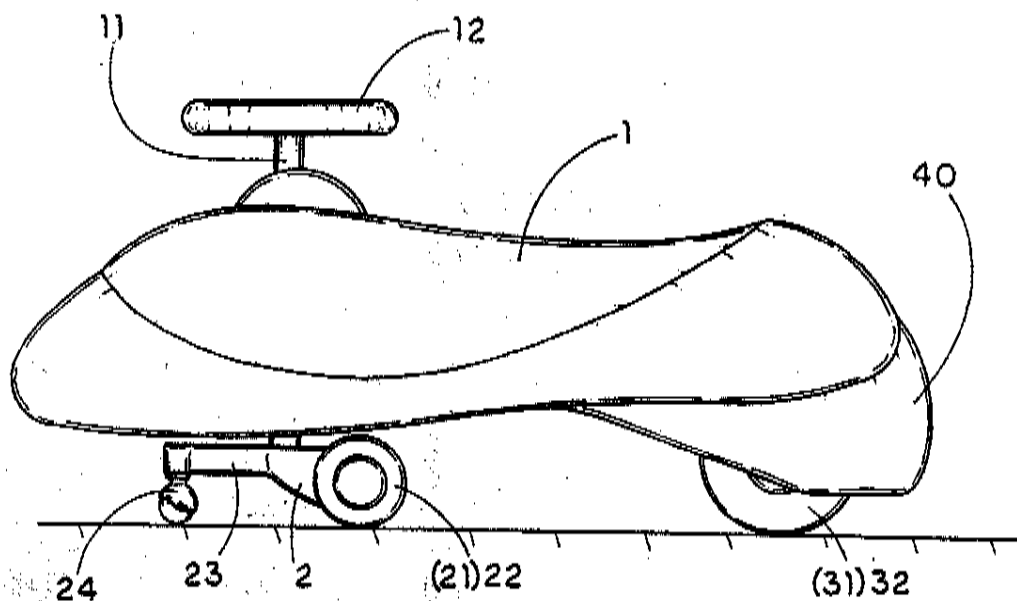


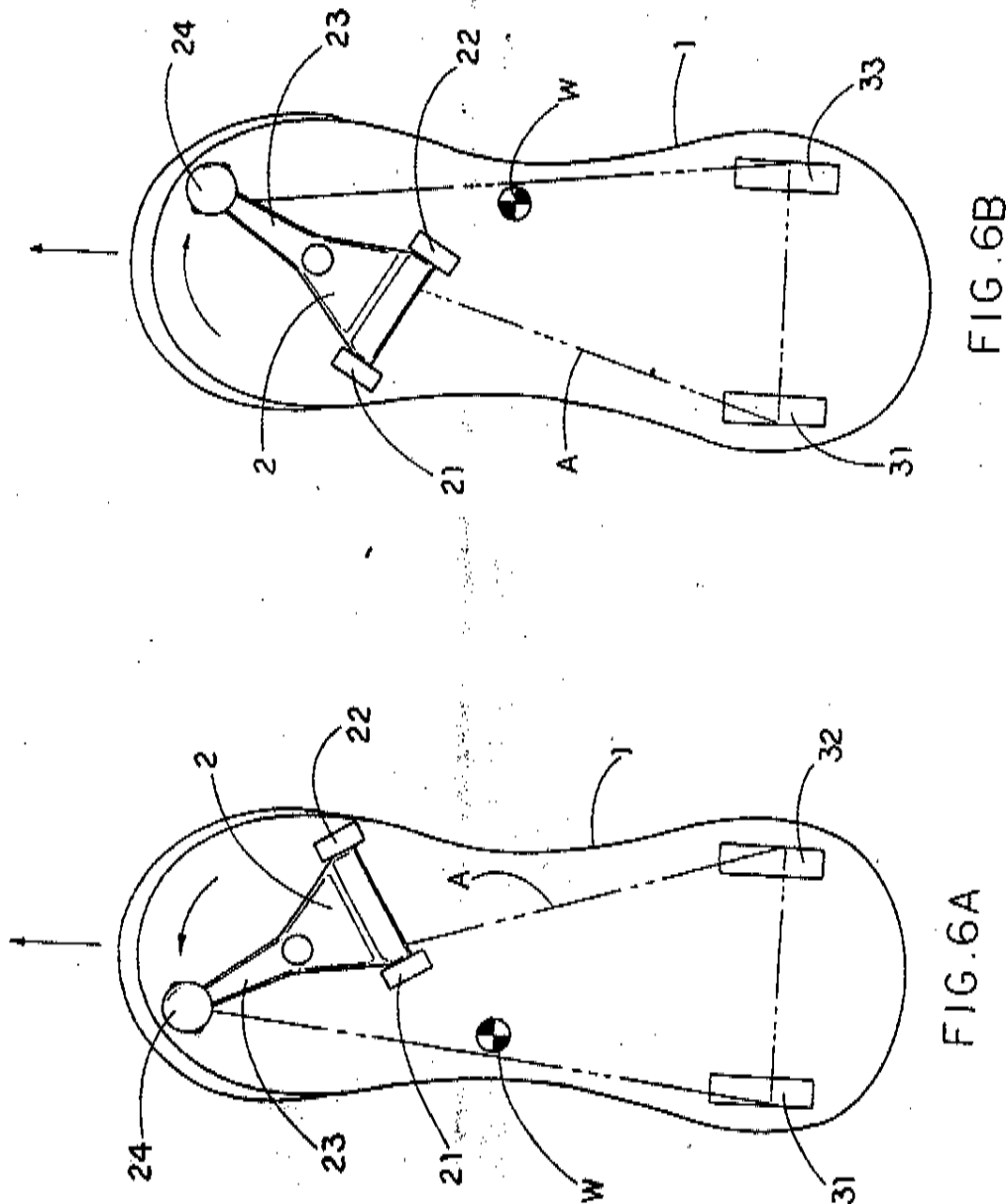
FIG. 5

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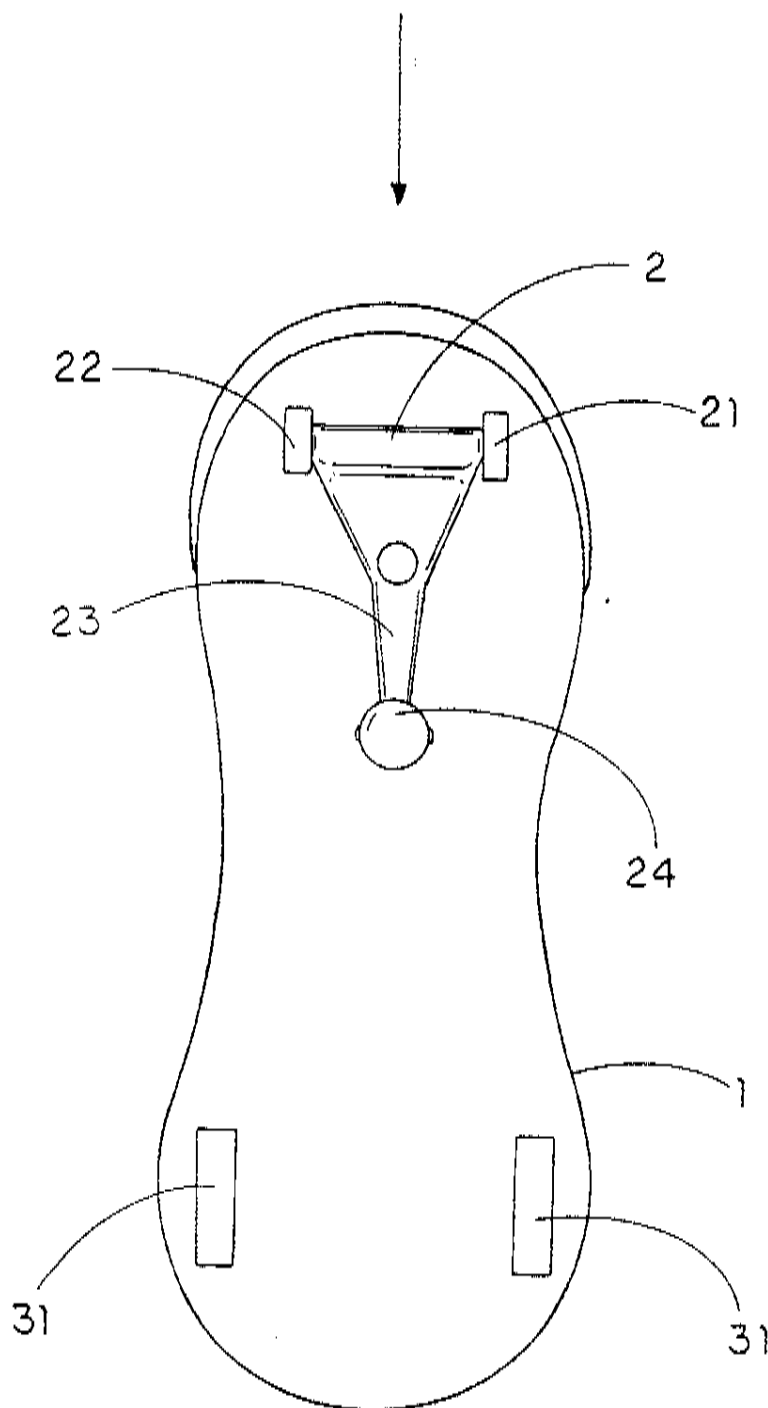


FIG. 7

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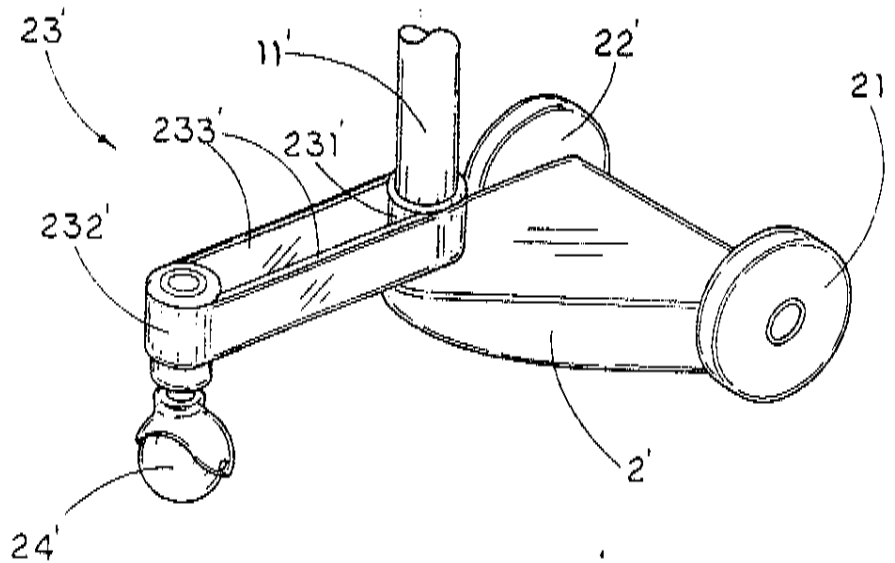


FIG. 8

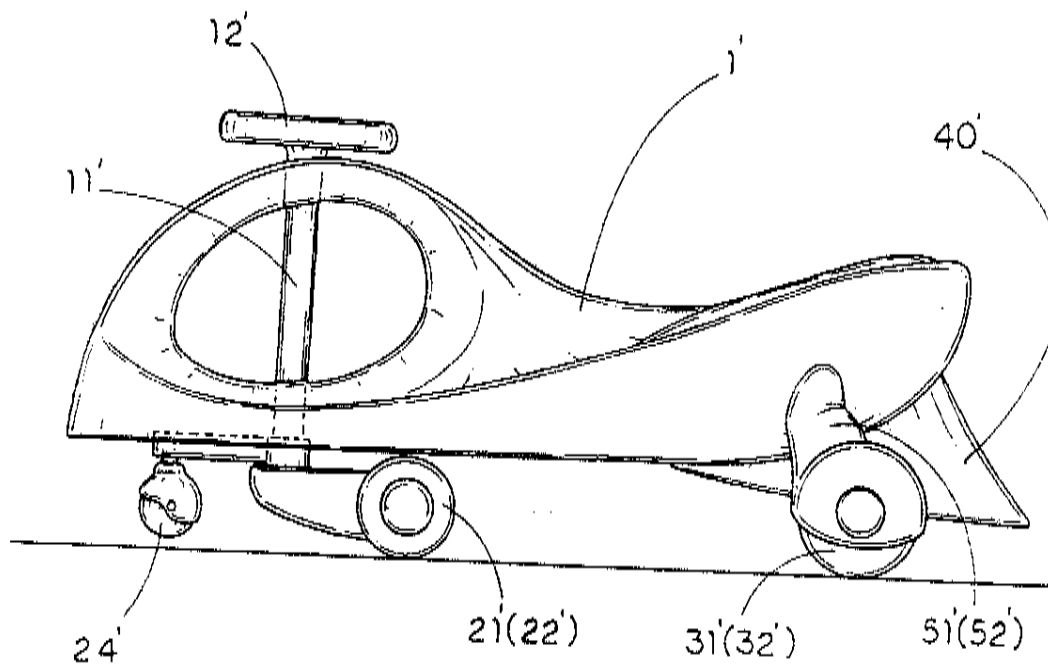


FIG. 9

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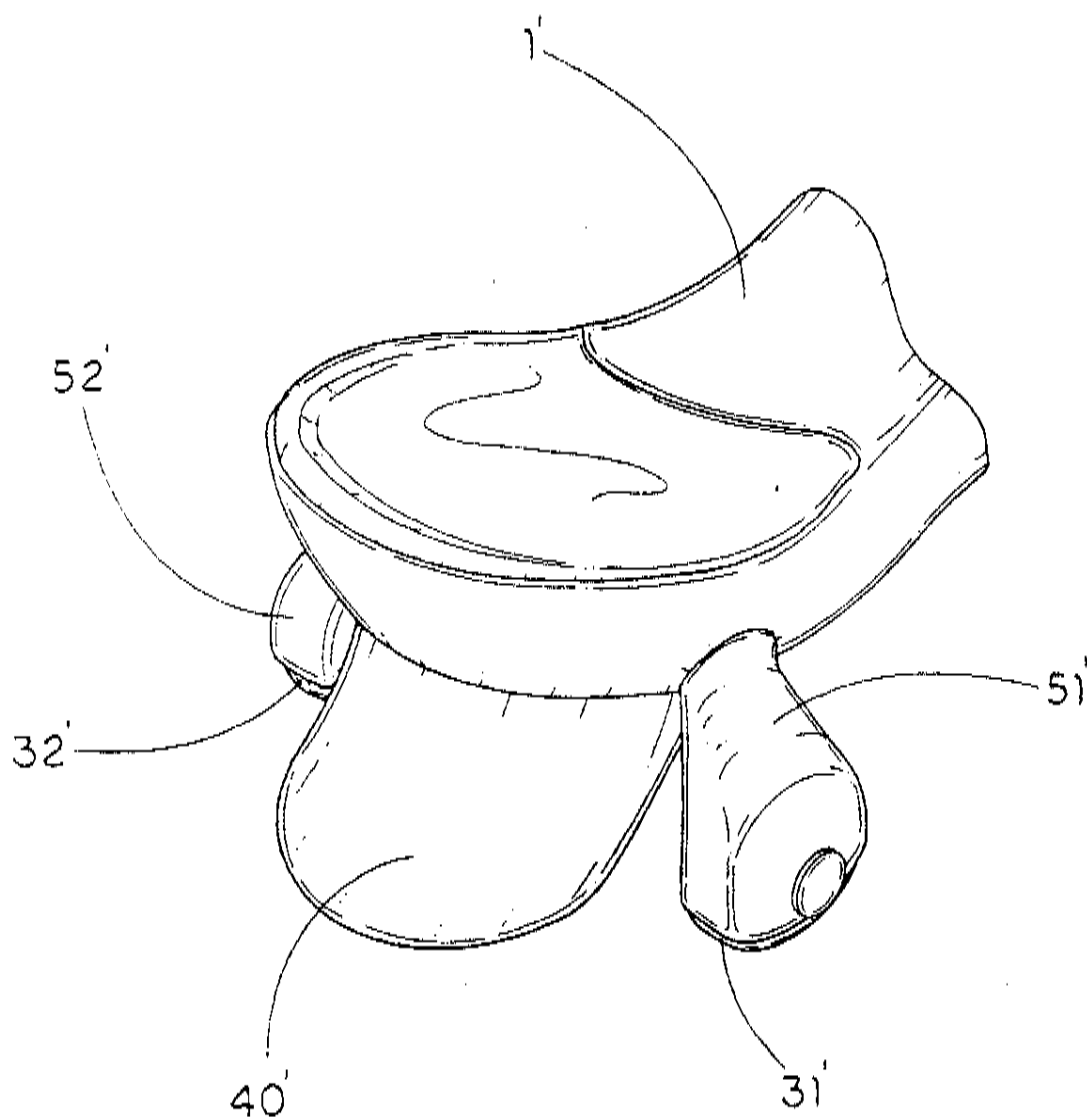


FIG. 10

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SAFETY DRIVING EQUIPMENT FOR
SCOOTER

This is a continuation in part of application Ser. No. 09/755,159, filed Jan. 8, 2001, now U.S. Pat. No. 6,431,566.

BACKGROUND OF THE PRESENT
INVENTION

1. Field of Invention

The invention herein relates to a safety driving equipment for a toddler's scooter, mainly to provide an auxiliary wheel, relative to the rear wheels of the scooter body, to the driving structure of a toy scooter to increase the safety area and regulating the location of the force center.

2. Description of Related Arts

As shown in FIG. 1, the side elevation isometric drawing of a conventional scooter structure comprises a scooter body 1, mounted with live left and right wheels 31, 32 at the rear side; in the front, one vertically disposed shaft level 11 with handbars 12 connected on the top and a driving triangular base 2 fastened at the bottom mounted with left and right rear driving wheels 21, 22; the rider straddled on the scooter body 1 turns the handbars 12 by hands to drive the triangular base 2 connected through the shaft level 11, thereby to move the left and the right driving wheels 21, 22 alternatively to achieve the function of wobbling movement in actuation.

Referring to FIGS. 2 and 3, as shown in the bird's eye view, the driving triangular base 2 centered by the shaft level 11 moves to the left or the right sides to enable the left and the right driving wheels 21, 22 to achieve the purpose of actuate approach alternatively; furthermore, as the force center W on the triangular base swings in a gear arc, the force center W will define a safety area A, usually at one of the auxiliary wheel on the driving triangular base and relative to the left rear wheel 31 or the right rear wheel 32; if the force center W locates within the safety area A, the scooter body will not flip over; while moving in a fast speed, the handbars 12 operated by hands will generate a reaction force which will make the force center W to receive a pulling force and shift its position; if the reaction force exceeds a certain degree (while the handbars are forcefully operated) and accelerates by the inertia force generated from the mass of the human body in a fast proceeding speed, the force center W will easily move beyond the safety area A and causes the danger of having the scooter body tumble forward and oblique; just as shown in the Figures, while moving the scooter by operating the shaft level 11 through the handbars 12, the triangular base 2 will deviate to right or left due to the generated reaction force and adding in the proceeding inertia of driving, the force center W will usually exceed the congruent sides of the triangular safety base; therefore, scooters similar to this kind tend to flip over.

Moreover, since the left and the right driving wheels 21, 22 are located close to a mid-portion of the scooter body 1, a head portion of the scooter body 1 is suspended with respect to the ground. Therefore, the scooter will easily be flipped over from the front especially when external force is exerted on the front portion of the scooter body 1 such as hitting to a curb or crossing a bump. Besides, when the rider sits close to a rear portion of the scooter body 1, which is also suspended with respect to the ground, the scooter will be flipped over from the back easily.

It is unreasonable to let a young child in a risky or unsafe situation. However, we have to tolerate the above mentioned suffering drawbacks until an improved scooter that can provide an absolutely safe for the rider to play with the scooter is developed.

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SUMMARY OF THE PRESENT INVENTION

A main object of the present invention is to provide a safety driving equipment for scooter, which can provide an absolutely safe scooter structure for a rider to avoid any unwanted flipping manner of the scooter.

Another object of the present invention is to provide a safety driving equipment for scooter, which comprises a safety wheel rotatably extended from a driving mechanism for supporting a front portion of the scooter body, so as to prevent the scooter body being flipped over from the front thereof.

Another object of the present invention is to provide a safety driving equipment for scooter, which comprises an anti-flip member affixed to a rear portion of the scooter body for reducing a vertical clearance between the rear portion of the scooter and the rear wheels, so as to avoid the scooter being flipped over from the back thereof.

Another object of the present invention is to provide a safety driving equipment for scooter, wherein the two rear wheels are further extended far apart from the scooter body for increasing the safety area of the scooter, so as to prevent the scooter being flipped over from the sides thereof.

Another object of the present invention is to provide a safety driving equipment for scooter, wherein no expensive or complicate mechanical structure is required to employ in the present invention in order to achieve the above mentioned objects. Therefore, the present invention successfully provides an economic and efficient solution for preventing the scooter being flipped over easily.

Specifically, the invention herein is consisted of an extended arm at the end relative to the driving wheels of the driving wheels of the driving mechanism; and a safety wheel capable of making universal rolling mounted lively at the end of the wheel arm. The driving mechanism is driven by a steering wheel through a transmission unit. Therefore, by moving around based on the transmission unit as the center and utilizing the relationship of the safety wheel relative to the rear wheels of the scooter body to increase the possibility of locating the force center in the regulated safety area.

To enable a further understanding of the objectives, the technological methods and the efficiency of the invention herein, the brief description of the drawings below is followed by detail description of the preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation drawing of a conventional scooter.

FIG. 2 is an isometric drawing of the deviated force center on the conventional scooter in wobbling.

FIG. 3 is a second isometric drawing of the deviated force center on the conventional scooter in wobbling.

FIG. 4 is a perspective view of a driving mechanism of a safety driving equipment for a scooter according to a first preferred embodiment of the present invention.

FIG. 5 is a side view of the scooter incorporated with the safety driving equipment according to the above first preferred embodiment of the present invention.

FIG. 6A is a bottom view of the scooter incorporated with the safety driving equipment according to the above first preferred embodiment of the present invention, illustrating the driving mechanism being turned in one direction.

FIG. 6B is a bottom view of the scooter incorporated with the safety driving equipment according to the above first preferred embodiment of the present invention, illustrating the driving mechanism being turned in another direction.

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FIG. 7 is a bottom view of the scooter incorporated with the safety driving equipment according to the above first preferred embodiment of the present invention, illustrating the scooter being moved backward.

FIG. 8 is a perspective view of a driving mechanism of a safety driving equipment for a scooter according to a second preferred embodiment of the present invention.

FIG. 9 is a side view of the scooter incorporated with the safety driving equipment according to the above second preferred embodiment of the present invention.

FIG. 10 is a perspective view of a rear wheel of the scooter incorporated with the safety driving equipment according to the above second preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 4 through 7 of the drawings, a scooter incorporated with a safety equipment according to a first preferred embodiment of the present invention is illustrated. The scooter, such as a conventional scooter, comprises a scooter body 1, a pair of rear wheels 31, 32 rotatably supported at a rear portion of the scooter body 1.

The scooter further comprises a transmission unit 11 having an upper control portion positioned above the scooter body 1 and a lower connecting portion extended underneath the scooter body 1, a steering means 12 affixed to the control portion of the transmission unit 11 for driving the connecting portion thereof to rotate in clockwise and anti-clockwise directions, a twister member 2 having a driven portion connected to the connecting portion of the transmission unit 11, and a pair of driving wheels 21, 22 spacedly and rotatably mounted to the twister member 2 wherein the two driving wheels 21, 22 are spaced apart from the driven portion of the twister member 2. Therefore, in order to drive the scooter, a rotating force must be applied on the steering means 12 to drive the twister to rotate in a clockwise and anti-clockwise manner.

The safety driving equipment comprises a supporting arm 23 frontwardly extended from the driven portion of the twister member 2 and a safety wheel 24 rotatably connected to a free end of the supporting arm 23 for supporting a front portion of the scooter body 1, so as to prevent the scooter from being flip over from the front thereof.

According to the preferred embodiment, the scooter body 1 has a receiving cavity wherein the two rear wheels 31, 32 are received therein via a wheel axle. In other words, the two rear wheels 31, 32 are operated within the receiving cavity of the scooter body 1.

Referring to FIG. 4, to prevent the problem of having the tendency to flip over of the conventional scooter, the supporting arm 23 is extended from the twist base 2. The safety wheel 24 is capable of making universal rolling mounted at the end of the supporting arm 23 and relative to the center forward position of the driving wheels 21, 22. Therefore, while the steering means 12 is operated to drive, through the center point defined by the transmission unit 11, as shown in FIG. 5, to make the twister member 2 to swing right and left, and also through the transmission unit 11 to gear the driving wheels 21, 22 to proceed actually to left or right.

According to the preferred embodiment, the steering means 12 comprises at least a hand bar which functions as a steering wheel for a rider to drive the twister member 2 to rotate wherein the steering means 12 is capable of not only moving the scooter forwardly or backwardly but also directing the course of the scooter.

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The transmission unit 11 is a shaft having a top end which is the driving portion of the transmission unit 11 connected to the steering means 12 and a bottom end which is the connecting portion of the transmission unit 11 connected to the twister member 2 wherein the transmission unit 11 is rotatably penetrated through the scooter body 1 in such a manner that the steering means 12 is arranged to drive the twister member 2 to rotate when a rotating force is applied on the steering means 12.

As shown in FIG. 4, the twister member 2 having a triangularly shaped, preferred isosceles triangularly shaped, has a front end portion which is the driven portion and two rear side portions rotatably affixed the two driving wheels 21, 22 thereto respectively. In other words, the two driving wheels 21, 22 have the same distance from the driven portion of the twister member 2. Therefore, due to the movement of the two driving wheels 21, 22 with respect to the driven portion of the twister member 2, the scooter is adapted for moving forwardly and backwardly. It is worth to mention that for moving the scooter forward, the driven portion of the twister member 2 is positioned in front of the two driving wheels 21, 22, and for moving the scooter backward, the driven portion of the twister member 2 is positioned behind the two driving wheels 21, 22.

Accordingly, the supporting arm 23 is integrally extended from the twister member 2 at the driven portion thereof and has a free end for rotatably connecting to the safety wheel 24.

The safety wheel 24, which is a free rotating wheel, comprises a vertical axle affixed to the supporting arm 23 and a wheel casing rotatably attached to a bottom end of the vertical axle and rotatably received a ball shaped rotating wheel in the wheel casing such that the safety wheel 24 is adapted to self-rotating 360 degrees with respect to the free end of the supporting arm 23. Therefore, when the twister member 2 is driven to rotate, the safety wheel 24 is capable of rotating with respect to the twister member 2, so as to prevent the safety wheel 24 being stunk when operating the scooter. The wheel casing further comprises a ball bearing encirclingly mounted thereto for enhancing the rotating wheel in a free rotating manner. Since the safety wheel 24 is frontwardly extended from the twister member 2 for supporting a front portion of the scooter body 1, the scooter will not be flipped over from the front thereof.

As shown in FIG. 5, the scooter further comprises an anti-flip member 40 integrally extended from a bottom side of the rear portion of the scooter body 1 for reducing a vertical clearance between the scooter body 1 and the rear wheels 31, 32. As it is mentioned in the background, the rear portion of the scooter body 1 is suspended with respect to the ground, which may cause the scooter flipped over. Therefore, the anti-flip member 40 can reduce the distance between the scooter body 1 and the ground so as to prevent the scooter from being flipped over from the back thereof.

Referring to FIGS. 6A and 6B, since there is the safety wheel 24 mounted lively at the end of the back of the supporting arm 23 on the twister member 2, if the scooter body 1 makes more obvious bounce during the proceeding movement, the safety wheel 24 will allow the forward touching point fall directly on the safety wheel 24. Also, as shown in FIG. 6, if the gravity force of the whole scooter body 1 leaning forward falls on the safety wheel 24, the safety wheel 24 relative to the two rear wheels 31, 32 mounted on the rear sides of the scooter body 1 will immediately define a larger triangular safety supporting area A, just as the force center W shown in FIGS. 2 and 3, (with the same movement,

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the deviating position will be the same), the force center W will be regulated within the larger safety area A, even when the steering means 24 is operated to deviate to the right, as shown in FIG. 7, the safety wheel 24 relative to the rear wheels 31, 32 will as well define a larger safety area A allowing the force center W to be regulated to shift within the safety area A. Therefore, protecting the scooter from the danger of flipping over, by means of the safety wheel 24 mounted at the end of the supporting arm 23 on the twister member 2 to efficiently enlarge the access to the safety area even if the force center deviates. Furthermore, the safety wheel 24 is a universal wheel, so either because of automatic movement, under force or wobbling operation, the safety wheel 24 will move along to any direction without encountering the obstacle caused by the angle of proceeding; basically, to have the safety wheel 24 with the height from the ground higher than that of the driving wheels 21, 22 and the safety wheel 24 cooperating in time with the rear wheels 31, 32 to form a larger safety area when the scooter body 1 bounces obviously during properly and efficiently achieves the safety purpose.

In order to drive the scooter forwardly, the driven portion of the twister member 2 must be positioned in front of the two driving wheels 21, 22, as shown in FIGS. 6A and 6B, in such a manner that when a clockwise rotating force and an anti-clockwise rotating force are subsequently applied on the steering means 12, the twister member 2 is driven to rotate in clockwise and anti-clockwise directions, so as to drive the scooter forward. When the driven portion of the two driving wheels 21, 22 are positioned in front of the twister member 2, as shown in FIG. 7, the scooter is driven to move backward by the above mentioned operation.

Furthermore, the length of the supporting arm 23 is better limited within the outer rim of the scooter body. If too long, the burden of operation the wobble will be affected; if too short, then there is no functional meaning. In fact, the length should be the diameter of the acute movement of the safety wheel 24 no longer than the wheel base between the two rear wheels 31, 32.

Referring to FIG. 8 of the drawings, a second embodiment illustrates an alternative mode of the above first embodiment of the present invention. According to the second embodiment, supporting arm 23' is securely attached to the connecting portion of the transmission unit 11'. The supporting arm 23' comprises a tubular sleeve 231' for the connecting portion of the transmission unit 11' passing through, a connecting member 232' having a vertical slot for connecting the safety wheel 24', and a pair of parallel extending members 233' extended between the tubular sleeve 231' and the connecting member 232'.

As shown in FIG. 9, the anti-flip member 40' having an arc shaped is affixed to the bottom side of the rear portion of the scooter body 1'. In other words, the anti-flip member 40' can be manufactured individually to attach to the conventional scooter so as to provide an anti-flip purpose for the scooter.

In order to reduce the size of the scooter, the scooter body 1' can be shaped slimly. However, the rear wheels 31, 32 are received in the receiving cavity of the scooter body 1 in the first embodiment. When reducing the width of the scooter body 1, the width of the rear wheels 31, 32 will be reduced as well, which may cause the scooter flipped over sidewardly.

In order to lengthen the distance between the two rear wheels 31', 32', the scooter body 1' further comprises a pair of wheel arms 51', 52' outwardly extended from two sides of

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the scooter body 1' for rotatably connecting the two rear wheels 31', 32' respectively. As shown in FIG. 10, each of the wheel arms 51', 52' has first end securely affixed to the respective side of the scooter body 1' and a second end having an elongated cavity for rotatably mounting the respective rear wheel 31', 32' via an axle. Therefore, the distance between the two rear wheels 31', 32' will be increased by the width of the scooter body 1' and lengths of the wheel arms 51', 52' for enhancing the stabilization of the scooter so as to prevent the scooter from being flipped over sidewardly.

Therefore, the invention herein provides a safety driving equipment for the scooter and meets new patent application requirements and is hereby lawfully submitted to the patent bureau for review and the granting of the commensurate patent rights.

What is claimed is:

1. A scooter, comprising:

a scooter body;

a pair of rear wheels rotatably supported at a rear portion of said scooter body;

a transmission unit having an upper control portion positioned above said scooter body and a lower connecting portion extended underneath said scooter body;

a steering means affixed to said control portion of said transmission unit for driving said connecting portion thereof to rotate in clockwise and anti-clockwise directions;

a twister member having a driven portion connected to said connecting portion of said transmission unit;

a pair of driving wheels spacedly and rotatably mounted to said twister member wherein said two driving wheels are spaced apart from said driven portion of said twister member; and

a safety driving equipment, comprising:

a supporting arm frontwardly extended from said driven portion of said twister member; and

a safety wheel which is rotatably mounted to a free end of said supporting arm to support a front portion of said scooter body and prevent said scooter from being flipped over.

2. The scooter, as recited in claim 1, further comprising an anti-flip member integrally extended rearwardly and downwardly from a bottom side of said rear portion of said scooter body to reduce a vertical clearance between said scooter body and said rear wheels.

3. The scooter, as recited in claim 2, wherein said supporting arm is integrally extended from said twister member at said driven portion thereof and said safety wheel is adapted arranged to self-rotating 360 degrees with respect to said free end of said supporting arm and supported above around when said two driving wheels are running on ground.

4. The scooter, as recited in claim 3, wherein said scooter further comprises a pair of wheel arms outwardly extended from two sides of said scooter body for rotatably connecting said two rear wheels, wherein each of said wheel arms has first end securely affixed to said respective side of said scooter body and a second end having an elongated cavity for rotatably mounting said respective rear wheel via an axle.

5. The scooter, as recited in claim 4, wherein said twister member which has a triangular shape has a front end portion, which is said driven portion connected to said connecting portion of said transmission unit, and two rear side portions rotatably affixed said two driving wheels thereto.

6. The scooter, as recited in claim 4, wherein said transmission unit is a shaft having a top end which is said driving

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portion of said transmission unit connected to said steering means and a bottom end which is said connecting portion of said transmission unit connected to said twister member, wherein said transmission unit is rotatably penetrated through said scooter body.

7. The scooter, as recited in claim 1, further comprising an anti-flip member attached to a bottom side of said rear portion of said scooter body, wherein said anti-flip member is extended rearwardly and downwardly from said bottom side of said rear portion to reduce a vertical clearance between said scooter body and said rear wheels.

8. The scooter, as recited in claim 7, wherein said supporting arm is integrally extended from said twister member at said driven portion thereof and said safety wheel is arranged to self-rotating 360 degrees with respect to said free end of said supporting arm and supported above ground when said two driving wheels are running on ground.

9. The scooter, as recited in claim 8, wherein said scooter further comprises a pair of wheel arms outwardly extended from two sides of said scooter body for rotatably connecting said two rear wheels, wherein each of said wheel arms has first end securely affixed to said respective side of said scooter body and a second end having an elongated cavity for rotatably mounting said respective rear wheel via an axle.

10. The scooter, as recited in claim 9, wherein said twister member which has a triangular shape has a front end portion, which is said driven portion connected to said connecting portion of said transmission unit, and two rear side portions rotatably affixed said two driving wheels thereto.

11. The scooter, as recited in claim 9, wherein said transmission unit is a shaft having a top end which is said driving portion of said transmission unit connected to said steering means and a bottom end which is said connecting portion of said transmission unit connected to said twister member, wherein said transmission unit is rotatably penetrated through said scooter body.

12. The scooter, as recited in claim 1, wherein said supporting arm is integrally extended from said twister member at said driven portion thereof and said safety wheel is arranged to self-rotating 360 degrees with respect to said free end of said supporting arm and supported above ground when said two driving wheels are running on ground.

13. The scooter, as recited in claim 1, wherein said scooter further comprises a pair of wheel arms outwardly extended from two sides of said scooter body for rotatably connecting said two rear wheels, wherein each of said wheel arms has first end securely affixed to said respective side of said scooter body and a second end having an elongated cavity for rotatably mounting said respective rear wheel via an axle.

14. The scooter, comprising:
a scooter body;

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a pair of rear wheels rotatably supported at a rear portion of said scooter body for running on ground;

a transmission unit having an upper control portion positioned above said scooter body and a lower connecting portion extended underneath said scooter body;

a steering means affixed to said control portion of said transmission unit for driving said connecting portion thereof to rotate in clockwise and anti-clockwise directions;

a twister member having a driven portion connected to said connecting portion of said transmission unit;

a pair of driving wheels spacedly and rotatably mounted to said twister member wherein said two driving wheels are spaced apart from said driven portion of said twister member; and

an anti-flip member integrally extended rearwardly and downwardly from a bottom side of a rear portion of said scooter body to define a rear distance between said anti-flip member and the ground and said rear distance is shorter than a vertical clearance between said scooter body and the ground.

15. The scooter, as recited in claim 14, wherein said scooter further comprises a pair of wheel arms outwardly extended from two sides of said scooter body for rotatably connecting said two rear wheels, wherein each of said wheel arms has first end securely affixed to said respective side of said scooter body and a second end having an elongated cavity for rotatably mounting said respective rear wheel via an axle.

16. The scooter, as recited in claim 15, said anti-flip member is securely attached to said bottom side of said rear portion of said scooter body.

17. The scooter, as recited in claim 15, wherein said supporting arm is integrally extended from said twister member at said driven portion thereof and said safety wheel is adapted to self-rotating 360 degrees with respect to said free end of said supporting arm.

18. The scooter, as recited in claim 15, wherein said twister member which has a triangular shape has a front end portion, which is said driven portion connected to said connecting portion of said transmission unit, and two rear side portions rotatably affixed said two driving wheels thereto.

19. The scooter, as recited in claim 18, wherein said transmission unit is a shaft having a top end which is said driving portion of said transmission unit connected to said steering means and a bottom end which is said connecting portion of said transmission unit connected to said twister member, wherein said transmission unit is rotatably penetrated through said scooter body.

* * * * *

The
United
States
of
America



**The Director of the United States
Patent and Trademark Office**

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extensions.

Jon W. Dudas

Director of the United States Patent and Trademark Office

(54) **SAFETY DRIVING ARRANGEMENT FOR TWIST VEHICLE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 35 days.

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(52) U.S. Cl. **280/87.021; 280/87.051**

(58) Field of Search 280/87.021, 87.01, 280/210, 240, 218, 242.1, 21.1, 87.051; 180/218, 65.1; D21/433, 424; 446/463, 424

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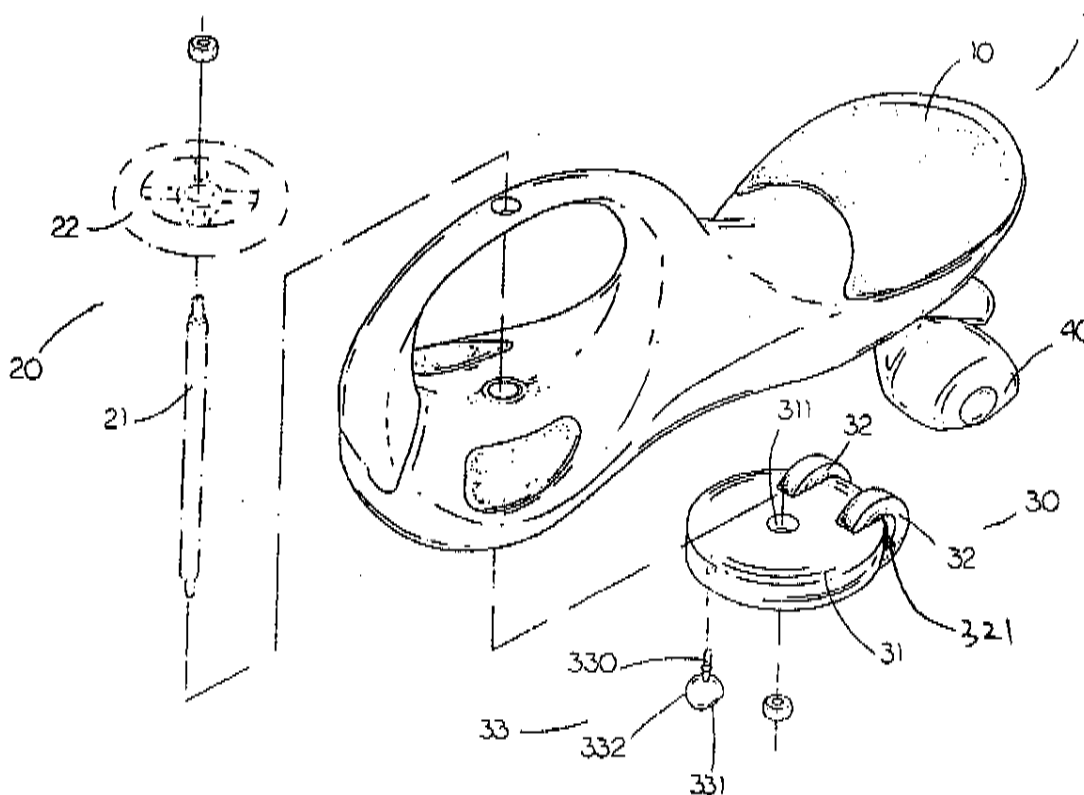
Primary Examiner--Hau Phan

(74) Attorney, Agent, or Firm--Raymond Y. Chan; David and Raymond

(57) **ABSTRACT**

A twist vehicle includes a vehicle frame, a driving system, and a safety driving arrangement. The driving system includes a transmission member, having an upper portion connected to a steering member, rotatably supported by the vehicle frame. The safety driving arrangement includes a twisting member connected to a lower portion of the transmission member, a driving wheel assembly rotatably connected to two rear side portions of the twisting member, and a front stabilizing wheel rotatably and suspendedly supported at a front portion of the vehicle frame with a safety distance between the safety wheel assembly and the lower portion of said transmission member, so as to prevent the twist vehicle from flipping over when the twist vehicle is moving.

4 Claims, 5 Drawing Sheets



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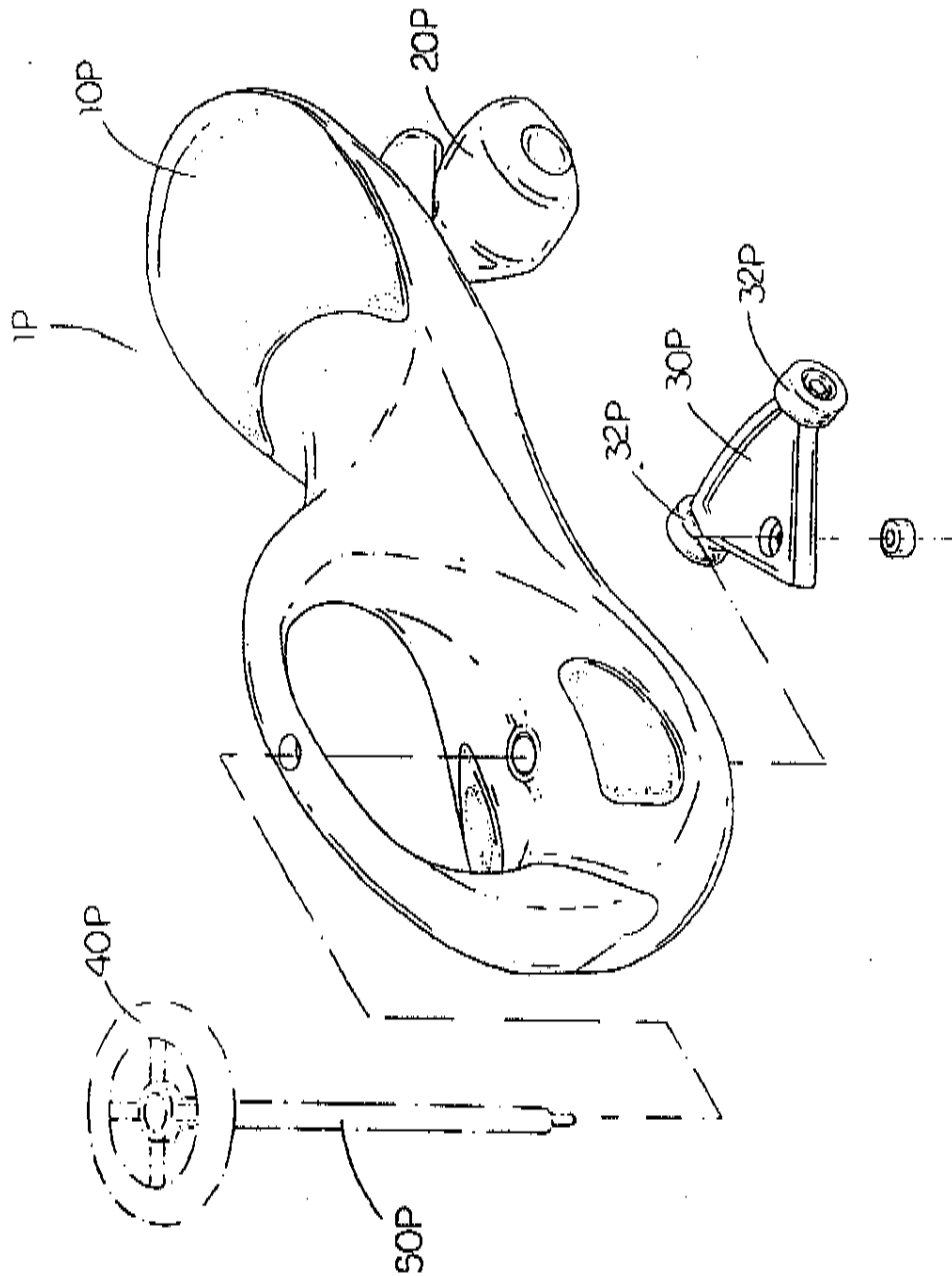


FIG. 1 (PRIOR ART)

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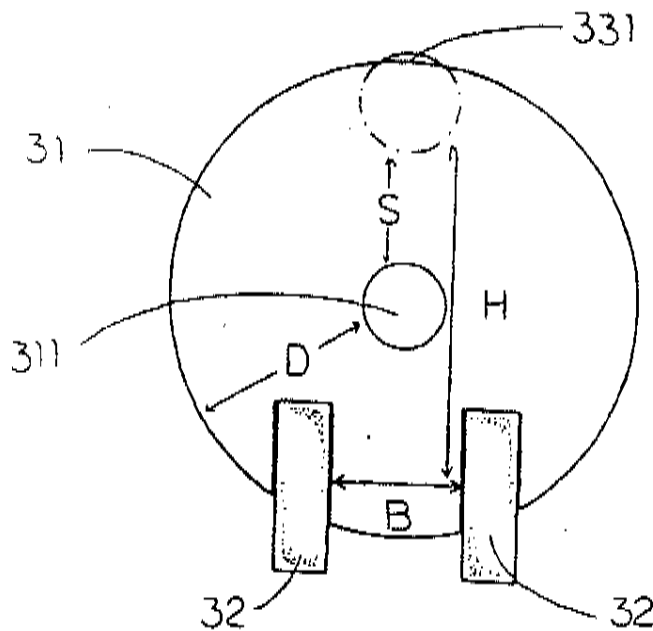


FIG. 3

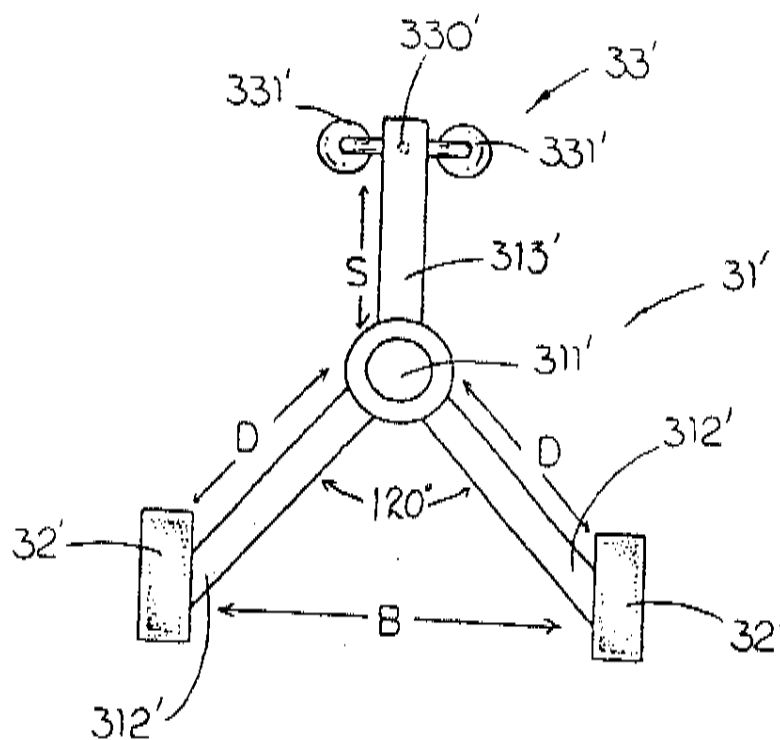


FIG. 5



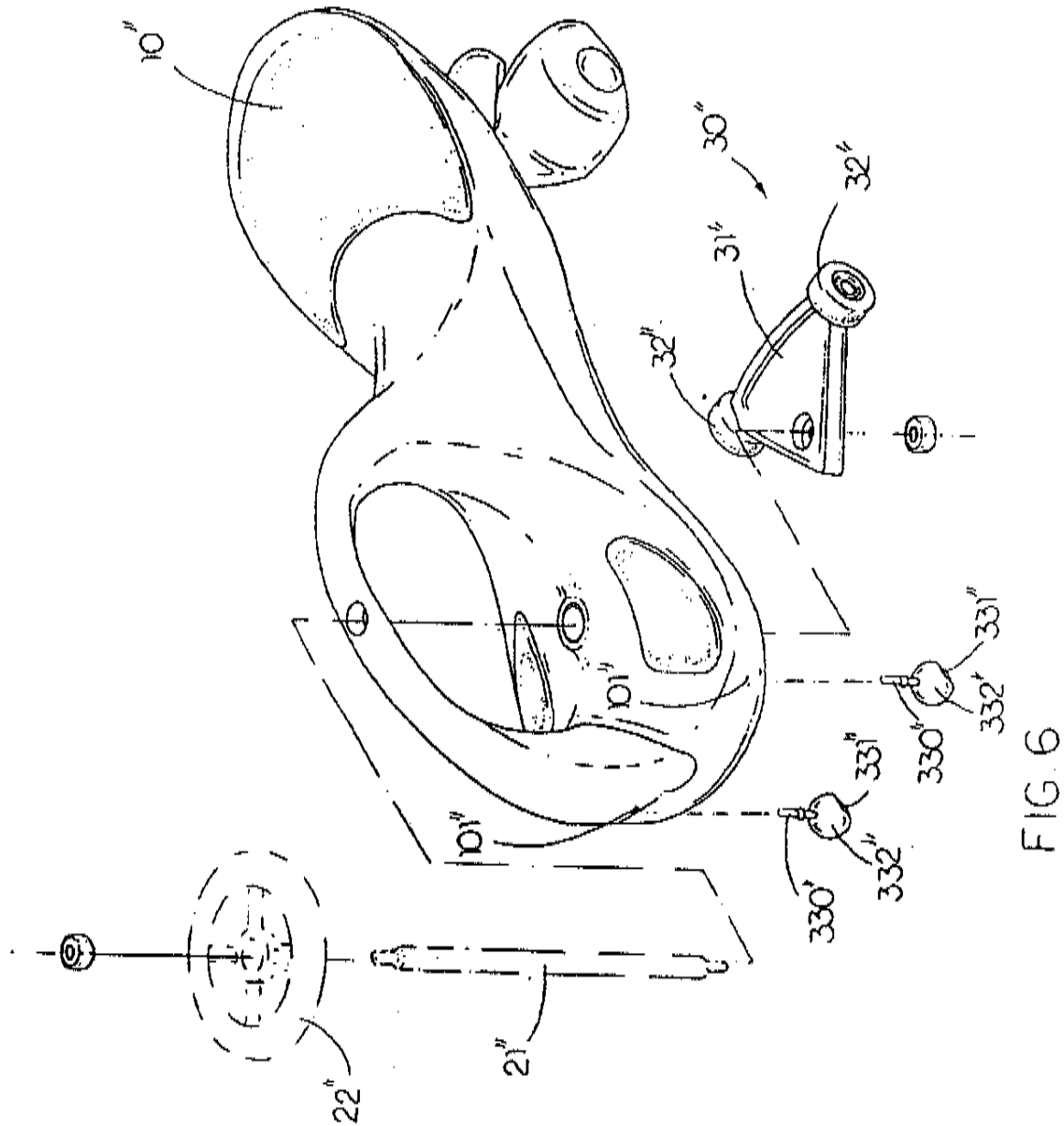
FIG. 2

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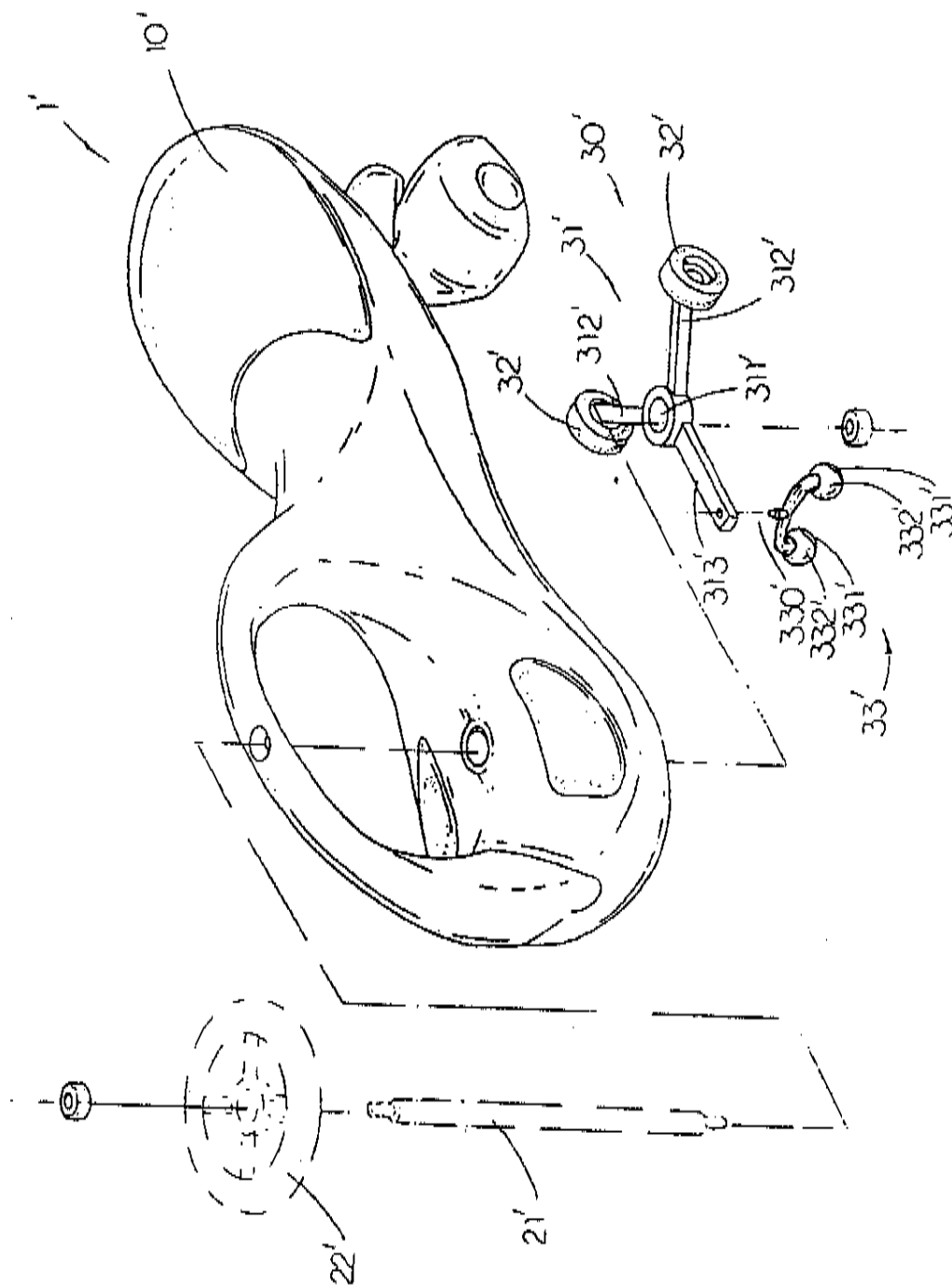


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SAFETY DRIVING ARRANGEMENT FOR TWIST VEHICLE

BACKGROUND OF THE PRESENT INVENTION

1. Field of Invention

The present invention relates to a vehicle, and more particularly to a twist vehicle incorporated with a safety driving arrangement which is capable of enhancing general stability of the twist vehicle while it is moving.

2. Description of Related Arts

Conventional twist vehicles have provided people, and especially children, an opportunity to entertain and do reasonable amount of exercise at the same time. Thus, they become more and more popular in the marketplace.

Referring to FIG. 1 of the drawings, a conventional twist vehicle 1P usually comprises a vehicle frame 10P, a rear wheel assembly 20P rotatably mounted on a rear portion of the vehicle frame 10P, a triangular twisting member 30P, a pair of driving wheels 32P rotatably and spacedly mounted on two corner portions of the twisting member 30P respectively, a steering member 40P rotatably provided on the vehicle frame 10P for driving and controlling the twist vehicle to move in a particular desirable direction, and a connecting member 50P which has an upper controlling end connected to the steering member 33P, and a lower driving end connected to a front corner portion of the twisting member 30P. Whereby, when twisting motions—subsequent clockwise and anti-clockwise movement are imparted to the steering member such as that imparted by a rider of the twist vehicle 1P, the twisting motions will be transmitted to the twisting member 30P via the connecting member 50P, and as a result, the twisting member 30P rotates accordingly about the connecting member 50P. The driving wheels 32P then drive the twist vehicle 1P to move.

Very often, a supporting wheel is rotatably mounted on the front corner portion of the twisting member 30P for supporting the twisting member 30P while the twist vehicle 1P is moving.

One skilled in the art should appreciate that the major reason which makes the twist vehicle to move hinges upon the geometrical arrangement of the driving wheels 32P. Specifically, the pair of driving wheels 32P must be spacedly apart from each other and that each of the driving wheels 32P must be spacedly apart from the axis of twisting, i.e. the corner portion of the twisting member 30P, or the supporting wheel. These geometrical constraints must be satisfied to ensure the twist vehicle's 'enablement'.

Due to the above geometrical constraints, the twisting member 30P of the conventional twist vehicle 1P is therefore triangular in shape, wherein the pair of driving wheels 32P is mounted at two rear corners of the twisting member 30P, while the supporting wheel is mounted in front of the driving wheels 32P. As a result, the axis of rotation while the twisting member 30P is being twisted is not coincident with the center of gravity of the triangular twisting member 30P. As a matter of fact, as the axis of rotation is shifted a little bit forward as compared with the center of gravity of the twisting member 30P, the rider may lose balance easily while driving and the whole twist vehicle may flip over. Besides, it is the triangular twisting member 30P that lacks supporting strength (because of its shape) to substantially support the twist vehicle.

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Moreover, conventional twist vehicles 1P suffer a pressing disadvantage of being unstable while moving. As stated above, the moving of the twist vehicle 1P is essentially driven by the twisting of the twisting member 30P, caused by the twisting of the steering member 40P. Therefore, the inherent structure and operation principle of conventional twist vehicle 1P induces its own instability.

On the other hand, it is expected that most of the riders of conventional twist vehicles 1P are children whose ability to balance themselves and control the twist vehicle are limited. Thus, when a child is riding the twist vehicle 1P, due to its inherent instability, the whole vehicle may be flipped over, as reasoned above. This is particularly true when the vehicle is turning around. The child involved may be knocked down on the ground in which the vehicle moved on. The consequence of such incident can be disastrous. In view of the above, anyone skilled in the art cannot simply afford to ignore the safety issue of the twist vehicle 1P.

SUMMARY OF THE PRESENT INVENTION

A main object of the present invention is to provide a safety driving arrangement for a twist vehicle which can substantially enhance the operational stability of the twist vehicle so as to provide maximum safety to the vehicle's rider.

Another object of the present invention is to provide a safety driving arrangement for a twist vehicle which comprises a twisting member having increased supporting surface area as compared with conventional twist vehicle, as a result, the supporting strength of the twisting member can be maximized.

Another object of the present invention is to provide a safety driving arrangement for a twist vehicle wherein the axis of rotation of its twisting member is arranged to substantially coincide with the center of gravity thereof, so that maximum support from the twisting member can be derived, ensuring maximum stability of the twist vehicle while moving.

Another object of the present invention is to provide a safety driving arrangement for a twist vehicle which comprises a stabilizing wheel assembly to provide enhanced support to the twist vehicle, especially when the twist vehicle is turning around.

Another object of the present invention is to provide a safety driving arrangement for a twist vehicle which does not require to significantly alter the original design of the twist vehicle.

Another object of the present invention is to provide a safety driving arrangement for a twist vehicle which does not involve complicated or expensive mechanical components so as to minimize the manufacturing and any related costs of the twist vehicle and the safety driving arrangement.

Accordingly, in order to accomplish the above objects, the present invention provides a twist vehicle, comprising:

- a vehicle frame;
- a rear wheel assembly rotatably mounted on a rear portion of the vehicle frame;
- a driving system, which comprises:
 - a transmission member rotatably supported by the vehicle frame wherein the transmission member has an upper control portion positioned above the vehicle frame and a lower driving portion extended underneath the vehicle frame; and
 - a steering member which is connected to the control portion of the transmission member and arranged to drive the driving portion of the transmission member to rotate; and

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a safety driving arrangement, which comprises:

a twisting member, having a predetermined shape, mounted on the driving portion of the transmission member;

two spaced apart driving wheels rotatably mounted to the twisting member and defining a driving distance between each driving wheel and the driving portion of the transmission member; in such a manner that when subsequent clockwise and anti-clockwise movements are imparted to the steering member, the two driving wheels are substantially moving forward, so as to drive the vehicle frame to move; and

a safety wheel assembly rotatably supported at a front portion of the vehicle frame with a safety distance between the safety wheel assembly and the driving portion of the transmission member, so as to prevent the twist vehicle from flipping over when the twist vehicle is moving.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a conventional twist vehicle.

FIG. 2 is an exploded perspective view of a twist vehicle incorporated with a safety driving arrangement according to a first preferred embodiment of the present invention.

FIG. 3 is a schematic diagram of the twisting member according to the above first preferred embodiment of the present invention.

FIG. 4 is a perspective view of a twist vehicle incorporated with a safety driving arrangement according to a second preferred embodiment of the present invention.

FIG. 5 is a schematic diagram of the twisting member according to the above second preferred embodiment of the present invention.

FIG. 6 is a perspective view of a twist vehicle according to a twist vehicle incorporated with a safety driving arrangement according to a third embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 2 of the drawings, a twist vehicle 1 incorporated with a safety driving arrangement 30 according to a first preferred embodiment of the present invention is illustrated. According to the first preferred embodiment, the twist vehicle 1 comprises a vehicle frame 10, a driving system 20, and a safety driving arrangement 30.

The driving system 20 comprises a transmission member 21, rotatably supported by the vehicle frame 10, having an upper control portion and a lower driving portion respectively extended above and below the vehicle frame 10 respectively, and a steering member 22 which is connected to the control portion of the transmission member 21 and arranged to drive the driving portion of the transmission member 21 to rotate.

Referring to FIGS. 2 to 3, the safety driving arrangement 30 comprises a twisting member 31, having a predetermined shape, mounted on the driving portion of the transmission member 21, and two spaced apart driving wheels 32 rotatably mounted to the twisting member 32 and defining a driving distance D between each driving wheel 32 and the driving portion of the transmission member 21, in such a manner that when subsequent clockwise and anti-clockwise movements are imparted to the steering member 22, the two driving wheels 32 are substantially moving forward, so as to drive the twist vehicle 1 to move.

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The safety driving arrangement 30 further comprises a safety wheel assembly 33 rotatably supported at a front portion of the vehicle frame 10 with a safety distance S between the safety wheel assembly 33 and the driving portion of the transmission member 21, so as to prevent the twist vehicle 1 from flipping over when the twist vehicle 1 is moving.

According to the preferred embodiment, when subsequent clockwise and anti-clockwise movements are imparted to the steering member 22, twisting motion will be induced at the transmission member 21, so as to drive the twist vehicle 1 to move. Accordingly, the transmission member 21 is essentially a shaft vertically and rotatably supported by the vehicle frame 10 in such a manner that the rotational movement at the control portion of the transmission member 21 is directly transmitting to the driving portion thereof.

Referring to FIGS. 2 to 3 of the drawings, the twisting member 31, having a circular shaped, has a center hub 311 connected to the driving portion of the transmission member 21.

The two driving wheels 32 are spacedly and rotatably mounted at a circumferential edge of the twisting member 31 via a wheel axle 321 to define the driving distance D between each of the driving wheels 32 and the driving portion of the transmission member 21, wherein the driving distance D is the radius of the twisting member 31. Moreover, the two driving wheels 32 are spaced apart with each to define a base length B therebetween so as to drive the twist vehicle 1 forward when the twisting member 31 is driven to be rotated via the steering member 22.

The safety wheel assembly 33 comprises a front stabilizing wheel 331 rotatably mounted at a front portion of the twisting member 31 to define the safety distance S between the front stabilizing wheel 331 and the center of the twist member 31 wherein the safety distance S is defined as a hypotenuse length H between each of the driving wheels 32 and the front stabilizing wheel 331.

The front stabilizing wheel 331 is suspendedly mounted on the twisting member 31 in such a manner that the front stabilizing wheel 331 is normally overhanging the ground in which the twist vehicle 1 stands, i.e. the front stabilizing wheel 331 does not normally touch the ground so as to normally get rid of the friction between the front stabilizing wheel 331 and the ground. As a result, during normal operation, the friction between the front stabilizing wheel 331 and the ground ceases to exist and smooth moving of the twist vehicle 1 can be ensured.

The safety wheel assembly 33 further comprises a wheel holders 330, which is rotatably mounted to the twisting member 31, has a wheel housing 332 extended from the wheel holder 330 to rotatably support the front stabilizing wheels 331. Note that the front stabilizing wheel 331 is adapted to move freely, i.e. 360° with respect to the twisting member 31, so as to allow maximum flexibility to substantially prevent the twist vehicle 1 from being unbalance or even flipped over, while unaffected the operation of the twist vehicle 1.

In other words, the driving wheels 32 are mounted at two circumferential side portions of the twisting member 31, whereas the front stabilizing wheel 331 is mounted on the front circumferential side portion of the twisting member 31. Accordingly, the diameter of the front stabilizing wheel 331 is made to be less than the diameters of the two driving wheels 32 which have the same diameter.

The twist vehicle 1 further comprises a rear wheel assembly 40 rotatably mounted on a rear portion of the vehicle frame 10 so as to rotatably support a rear portion of the twist vehicle 1.

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Thus, when subsequent clockwise and anti-clockwise movement are imparted to the steering member 22 to induce the twisting motion of the transmission member 21, the twisting member 31 will rotate about its center accordingly, with the driving wheel assembly 32 driving the twist vehicle 1 to move.

It is worth elaborating that the shape of the twisting member 31 is different from conventional ones, and this feature underpins one of the several subject matters that the present invention possesses. As mentioned above, the twisting member 31 is of circular in shape which is capable of maximizing the supporting area of the twisting member 31 as compared with those conventional triangular twisting members. However, at the same time, the fact that the twisting member 31 is circular in shape does not affect the smooth operation of the twist vehicle 1, in that the driving wheels 32 are arranged to sufficiently position apart from each other and from the front stabilizing wheel 331 at a distance of the base length B and the hypotenuse length H respectively.

In other words, for a given conventional twisting member which is triangular in shape, and has particular base length B and hypotenuse length H which are essentially the distance between the pair of driving wheels 32, and the distance between the front stabilizing wheel 331 and each of the driving wheels 32 respectively, constructing a circular twisting member which has the same base length B and the hypotenuse length H of the driving wheels 32 and the front stabilizing wheel 331 would enhance, if not maximize, the supporting strength of the twisting member 31.

Furthermore, since the transmission member 21 is connected with the twisting member 31 at the center of gravity thereof, maximum supporting strength can be derived from the twisting member 31 and therefore maximum stability of the twist vehicle 1 during operation can be ensured.

One skilled in the art would appreciate that when operating, a rider of the twist vehicle 1 of the present invention will twist the steering member 22 in order to make the vehicle move forwardly. During twisting, the rider may, accidentally yet unavoidably, depress, due to occasional unbalance or otherwise, the steering member 22 and all other interconnected components, such as the transmission member 21 and the twisting member 31. Thus, the front stabilizing wheel 331 acts as a stabilizer to provide sufficient support in such a way that the twist vehicle 1 will not flip over forwardly, while keeping the movement of the twist vehicle 1 intact. In other words, the front stabilizing wheel 331 forms an auxiliary wheel to assist balancing the twist vehicle 1. Note that the front stabilizing wheel 331 would not normally touch the ground unless unbalancing of the rider happens. Thus, any negative effect, such as increased friction, as demonstrated by the front stabilizing wheel 331 can be minimized.

Referring to FIG. 4 of the drawings, the twist vehicle 1' of a second embodiment illustrates an alternative mode of the first embodiment of the present invention, wherein the configuration of the twist vehicle 1' of the second embodiment is the same as that of the first embodiment, excepting the safety driving arrangement 30'.

As shown in FIGS. 4 and 5, the safety driving arrangement 30' comprises a twisting member 31' comprising a central hub 311' connected to the driving portion of the transmission member 21', two wheel shafts 312' rearwardly and radially extended from the central hub 311' to rotatably connect the driving wheels 32' respectively, so as to define the driving distance D with a length of each of the wheel shafts 312', and a front wheel arm 313' frontwardly and radially extended from the central hub 311' to connect the safety wheel assembly 33' so as to define the safety distance S with a length of the front wheel arm 313'. Therefore, when

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the transmission member 21' is driven to rotate via the rotational movement of the steering member 22', the twisting member 31' is rotated accordingly about the central hub 311'. It is worth accentuating that given the geometrical structure of the twisting member 31', the center of gravity of the twisting member 31' is substantially coincident with the central hub 311' in which the transmission member 21' is mounted. Therefore, given the particular twisting member 31', maximum stability can be ensured.

The safety wheel assembly 33' comprises two front stabilizing wheels 331' spacedly mounted on the free end of the front wheel arm 313'. The safety wheel assembly 33' further comprises a wheel holder 330' rotatably mounted to the free end of the front wheel arm 313' and two wheel housings 332' radially extended from the wheel holder 330' to rotatably support the front stabilizing wheels 331' respectively, in such a manner that the front stabilizing wheels 331' are capable of turning with respect to the free end of the front wheel arm 313'.

The front stabilizing wheels 331' are suspendedly mounted at the twisting member 31' in such a manner that the front stabilizing wheels 331' are normally overhung the ground in which the twist vehicle 1' stands. Accordingly, the front stabilizing wheels 331' substantially increase the supporting area with respect to the ground and help in supporting and stabilizing the twist vehicle 1' when it is moving, especially when the twist vehicle 1' is turning around.

In order to enhance the safety feature of the twist vehicle 1', the length of the front wheel arm 313' can be substantially increased to lengthen a distance between the safety wheel assembly 33' so as to enhance the safety distance S thereof. In other words, the twist vehicle 1' does not need to alter its structural design to enhance the safety feature.

Moreover, an angle of the wheel shafts 312' with respect to the central hub 311' can be adjusted to alter the driving distance D between the driving wheels 32'. By increasing the angle of the wheel shafts 312', the driving distance D of the driving wheels 32' will be substantially increased to enhance the driving operation of the twist vehicle 1'. Preferably, the wheel shafts 312' are radially extended from the central hub 311' with the angle at least 120°, so as to lengthen the base length b between the driving wheels 32'.

It is worth mentioning that the front stabilizing wheels 331' are capable of freely rotating, i.e. 360° rotating, with respect to the front wheel arm 313' so as to maximize the flexibility of front stabilizing wheels 331' in supporting the twist vehicle 1' without affecting the normal operation thereof.

One skilled in the art should appreciate that by adding the safety wheel assembly 33' to the twisting member 31', i.e. two rotational supports to the twist vehicle 1', the chance of flipping over of the twist vehicle 1' will be substantially decreased. Specifically, the torque generated which tends to flip over the twist vehicle 1' during driving is decreased.

As shown in FIG. 6, a twist vehicle 1" of a third embodiment illustrates another alternative mode of the first embodiment of the present invention, wherein the configuration of the twist vehicle 1" of the third embodiment is the same as that of the first embodiment, such as the vehicle frame 10", the transmission member 21", and steering member 22" of the driving system 20", excepting the safety driving arrangement 30".

According to the third embodiment, the safety driving arrangement 30" comprises a twisting member 31" mounted to the driving portion of the transmission member 21" and two spaced apart driving wheels 32" rotatably mounted to the twisting member 31". Accordingly, the twisting member 31" can be constructed as any shape, such as a conventional triangular shape, a circular shape as embodied in the first embodiment, or V-shape as embodied in the second embodiment.

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The safety driving arrangement 30" further comprises a safety wheel assembly 33" rotatably supported at the front portion of the vehicle frame 10" to prevent the twist vehicle from flipping over when the twist vehicle 1" is moving, wherein the safety wheel assembly 33" comprises at least a front stabilizing wheel 331" rotatably mounted at a bottom edge portion of the vehicle frame 10", so as to maximize the safety distance S by means of a size of the vehicle frame 10".

As shown in FIG. 6, the safety wheel assembly 33" comprises two front stabilizing wheels 331" rotatably mounted at two bottom side edge portions of the vehicle frame 10" at the front portion thereof respectively via two wheel holder 330" to define the safety distance S between each of the front stabilizing wheels 331" and the driving portion of the transmission member 21".

Accordingly, each of the wheel holders 330", which is rotatably mounted to the respective bottom side edge portion of the vehicle frame 10" through a mounting slot 101" provided thereon, has a wheel housing 332" extended from the wheel holder 330" to rotatably support the respective front stabilizing wheels 331", in such a manner that the front stabilizing wheel 331" is capable of turning with respect to the vehicle frame 10".

Each of the front stabilizing wheels 331" is suspendedly mounted on the twisting member 31 in such a manner that the front stabilizing wheel 331" is normally overhung the ground in which the twist vehicle 1" stands, i.e. each of the front stabilizing wheel 331" does not normally touch the ground so as to normally get rid of the friction between the front stabilizing wheel 331" and the ground. In addition, the front stabilizing wheels 331" are capable of freely rotating, i.e. 360° rotating, with respect to the vehicle frame 10" so as to maximize the flexibility of front stabilizing wheels 331" in supporting the twist vehicle 1" without affecting the normally operation thereof.

In view of above, the twist vehicle can substantially enhance the operational stability thereof to provide maximum safety to the vehicle's rider without altering the original design of the twist vehicle. Moreover, the twisting member is increased its supporting surface area as compared with conventional twist vehicle to enhance the supporting strength of the twisting member for stabilization purpose.

What is claimed is:

1. A twist vehicle, comprising:
 - a vehicle frame;
 - a rear wheel assembly rotatably mounted on a rear portion of said vehicle frame;
 - a driving system, which comprises:
 - a transmission member rotatably supported by said vehicle frame wherein said transmission member has an upper control portion positioned above said vehicle

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frame and a lower driving portion extended underneath said vehicle frame; and

a steering member which is connected to said control portion of said transmission member and arranged to drive said driving portion of said transmission member to rotate; and

a safety driving arrangement, which comprises:

a twisting member, having a predetermined shape, mounted on said driving portion of said transmission member;

two spaced apart driving wheels rotatably mounted to said twisting member and defining a driving distance between each said driving wheel and said driving portion of said transmission member; in such a manner that when subsequent clockwise and anti-clockwise movements are imparted to said steering member, said two driving wheels are substantially moving forward, so as to drive said vehicle frame to move; and

a safety wheel assembly rotatably supported at a front portion of said vehicle frame with a safety distance between said safety wheel assembly and said driving portion of said transmission member, so as to prevent said twist vehicle from flipping over when said twist vehicle is moving, wherein said twisting member, having a circular shaped, has a center hub connected to said driving portion of said transmission member so as to substantially increase a supporting area of said twisting member, wherein said two driving wheels are rotatably and spacedly mounted at a circumferential edge of said twisting member at a rear portion thereof so as to define said driving distance as a radius of said twisting member.

2. The twist vehicle, as recited in claim 1, wherein said safety wheel assembly comprises a front stabilizing wheel rotatably mounted at a front portion of said circumferential edge of said twisting member at a position underneath said front portion of said vehicle frame, so as to define said safety distance as said radius of said twisting member.

3. The twist vehicle, as recited in claim 1, wherein said safety wheel assembly is suspendedly mounted at said twisting member in a freely rotatable manner, so as to minimize a friction of said front stabilizing wheel with respect to the ground while said twist vehicle is moving.

4. The twist vehicle, as recited in claim 2, wherein said safety wheel assembly is suspendedly mounted at said twisting member in a freely rotatable manner, so as to minimize a friction of said front stabilizing wheel with respect to the ground while said twist vehicle is moving.

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